Control Equipment Limited

Precept[en] Fire Detection/Alarm Panel

and Precept[en] Repeater

Application Guide

List of Contents

1. List Of Figures 3
2. List Of Tables 3
3. Introduction 4
4. General Description 4
   4.1 Cabinet Specifications 4
      4.1.1 Surface Panel Order Codes & Descriptions 5
      4.1.2 Semi-flush Panel Order Codes & Descriptions 6
      4.1.3 Precept[EN] Fully Flush Panel Order Codes and Descriptions 6
   4.2 Panel Description 7
      4.2.1 C1626 2/4 Zone Motherboard 8
      4.2.2 C1627 8/16/32 Zone Motherboard 8
      4.2.3 C1632 16 Zone Expansion Board 8
      4.2.4 C1628 16 Zone Display Board and C1629 32 Zone Display Board 8
      4.2.5 C1631 Repeater Interface Board 8
   4.3 Panel assembly 9
   4.4 Precept[EN] panel range 12
   4.5 Precept[EN] Repeater Description 12
5. Functional Specification 12
   5.1 Panel Input/Output List 12
   5.2 Features List 13
6. Precept[EN] C1627 Motherboard Features 15
7. Precept[EN] C1632 16 zone expansion board Features 16
8. Power Supplies 16
   8.1 Battery Charger 16
   8.2 Visual indications 16
   8.3 Fault Outputs 17
   8.4 Battery Disconnect 17
   8.5 32 Zone Precept[EN] Power Supply Features And Connections 17
9. Compatible Field Devices 18
   9.1 Field Device Order Codes & Descriptions 18
10. Overview Of User Functions 20
   10.1 User Indications 20
   10.2 User Controls 21
   10.3 Selection of Detection Zones or Outputs for Disablement, Enablement or Test . 22
   10.4 Disablement/Re-enablement of Detection Zones and Outputs 22
   10.5 Detector Zone One man Test. 22
   10.6 Alarm Sounder One man Test 22
11. Overview Of Engineers Functions 22
   11.1 Engineer's configuration process 22
   11.2 Configurable Detection Zones 23
   11.3 Delay zone configuration 23
   11.4 Standard or Intrinsically Safe zone. .. 23
   11.5 Short circuit fire configuration 23
   11.6 The Delay mode feature 23
   11.7 Configure Delay Zones 23
   11.8 1- 2 Stage Delay 24
   11.9 Selection of outputs to be delayed 24
   11.10 Selectable Zonal or General Alarm sounder operation 24
   11.11 Pulse Non-Alarm Zones 24
   11.12 Inhibit Fire Protection on Non-Latched Zone 24
   11.13 Delay Alarm Silence and Reset 24
   11.14 Alarms on Evacuate Only 24
   11.15 Silence Before Reset 24
   11.16 Silent Zone Test 24
   11.17 Buzzer Disable 24
   11.18 Latched Faults 24
   11.19 Repeater Configuration 24
   11.20 Output Relay Configuration 24
   11.21 Earth Fault monitoring. 25
12. Panel Repeaters 25
13. Circuit Connection Details 25
   13.1 2-16 Zone Motherboard Termination Details 25
   13.2 16 Zone Expansion Board Termination Details 25
   13.3 Auxiliary Supply 26
   13.4 Fire Routing, Fire Protection and Fault Routing Outputs 26
   13.5 Use of Auxiliary Inputs 27
   13.6 Sounder Circuits 27
14. Electrical Design of Detection Zones 27
   14.1 Maximum Number of Devices on a Zone 27
15. C1651 Timer Module - General 28
   15.1 Clock Module Functionality 28
   15.2 Clock Module Edit Facility 28
      15.2.1 Clock Module- User Control/Editing 28
      15.2.2 Clock Module Engineer's Editing and Configuration 28
   15.3 C1651 Clock Module PCB Features 29
16. Mechanical, Electrical And Environmental Specification 31
17. Precept[EN] Input and Output Specification 33
   Ancillary Inputs 33
18. Appendix 36
   18.1 EN54 Optional Functions With Requirements 36
   18.2 Ancillary Functions Not Required By EN54 36
   18.3 Power Supply Load Calculation 36
   18.4 Battery Standby Capacity Calculation 36
   18.5 Panel Configuration Design Chart 38

1. List Of Figures

FIGURE 1 - PRECEPT[EN] EXTERNAL VIEW- SURFACE BOXES 4
FIGURE 2 - PRECEPT[EN] EXTERNAL VIEW- SEMI FLUSH BOXES 5
FIGURE 3 - PRECEPT[EN] EXTERNAL VIEW- FULLY FLUSH BOXES 6
FIGURE 4 - 2/4 ZONE PRECEPT[EN] PANEL MAIN COMPONENTS 7
FIGURE 5 - 8/16 ZONE PRECEPT[EN] PANEL MAIN COMPONENTS 7
FIGURE 6 - 32 ZONE PRECEPT[EN] PANEL MAIN COMPONENTS 8
FIGURE 7 - 2/4 ZONE PRECEPT[EN] PANEL- GENERAL ASSEMBLY [WITH OPTIONAL CLOCK/TIMER MODULE] 9
FIGURE 8 - 8/16 ZONE PRECEPT[EN] PANEL- GENERAL ASSEMBLY [WITH OPTIONAL CLOCK/TIMER MODULE] 10
FIGURE 9 - 32 ZONE PRECEPT[EN] PANEL- GENERAL ASSEMBLY [WITH OPTIONAL CLOCK MODULE].....11
FIGURE 10 - C1627 PRECEPT[EN] MOTHERBOARD LAYOUT 15
FIGURE 11 - PRECEPT[EN] C1632 16 ZONE EXPANSION BOARD 16
FIGURE 12 - 32-ZONE PRECEPT[EN] POWER SUPPLY LAYOUT 17
FIGURE 13 - C1627 FIELD TERMINATION.....25
FIGURE 14 - C1632 16 ZONE EXPANSION BOARD FIELD TERMINATION 25
FIGURE 15 - FIRE ROUTING, FIRE PROTECTION AND FAULT ROUTING CONNECTIONS.....26
FIGURE 16 - RESET RELAY CONTACT CONNECTION DETAILS 27
FIGURE 17 - AUXILIARY I/P CONNECTION DETAIL.....27
FIGURE 18 - ALARM CIRCUIT CONFIGURATION.....27
FIGURE 19 - C1651 CLOCK MODULE PCB.....29
FIGURE 20 - TYPICAL PRECEPT[EN] WIRING DIAGRAM 30

2. List Of Tables

TABLE 1 - MOTHERBOARD DIL SWITCH CONFIGURATION DESIGN/RECORD 38
TABLE 2 - ZONE CONFIGURATION DESIGN/RECORD..... 39
TABLE 3 - OUTPUT DELAY CONFIGURATION DESIGN/RECORD 39

3. Introduction

This document contains information about the Precept[en] control panel necessary for application design.

The following supporting documentation is also available:

- Precept[en] Sales Literature
- Precept[en] User Manual
- Precept[en] Installation and Commissioning Manual.
- Precept[en] Log Book.
- Wiring Recommendations

4. General Description

The Precept[en] Panel range is fully compliant with the mandatory requirements and selected optional requirements of EN54-2 and 4 as well as the relevant requirements of BSEN5839-1:2002.

The Precept[en] equipment range:

Panels: 2, 4, 8, 16 and 32 zone versions.

Repeater: 2 to 8, 16 and 32 zone versions.

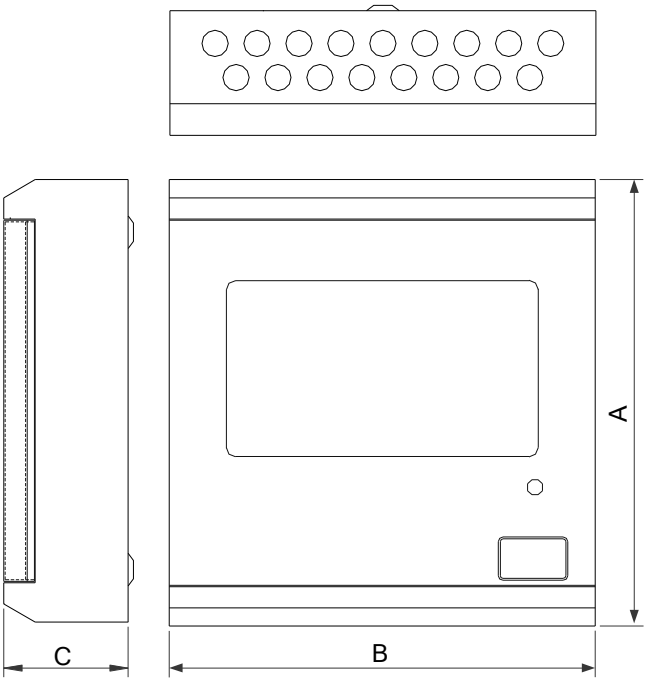
A system comprises of the following:

- One off Precept[en] 2, 4, 8, 16 or 32 zone fire detection and alarm panel.
- Up to 5 off Repeater Panels [2 to 8, 16 or 32 zone variants].

Each panel in the range is housed in a single metal enclosure incorporating a door-mounted display board fitted with a polyester overlay providing user controls and indications. User controls are locked & unlocked via a key-switch. All indications are implemented using LEDs. The power supply and standby batteries are housed within the panel enclosure.

4.1 Cabinet Specifications

Figure 1 - Precept[en] external view- surface boxes



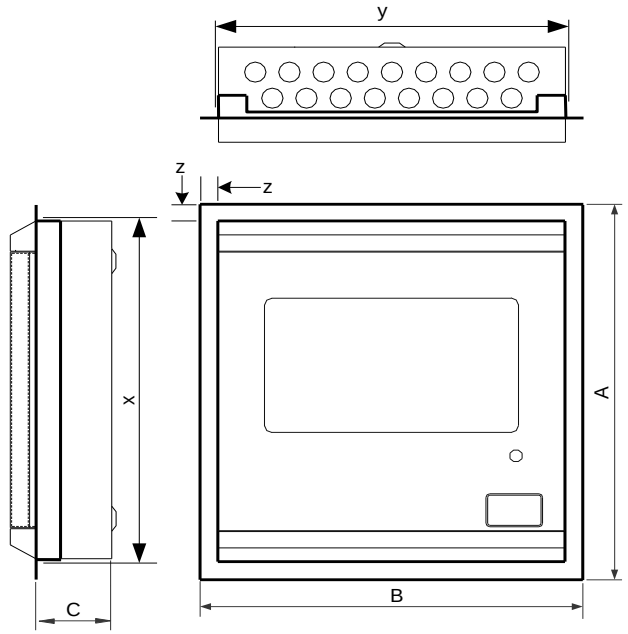
	2/4/8/16 zone panel	32 zone panel	8/16 zone repeater	32 zone repeater
Top entry 20mm knock outs	26	32	26	32
Dim A [mm]	370	441	370	441
Dim B [mm]	325	400	325	400
Dim C [mm]	126	131	126	131

4.1.1 Surface Panel Order Codes & Descriptions

Part Number	Description
2605100	2 Zone Panel
2605101	4 Zone Panel
2605102	8 Zone Panel
2605103	16 Zone Panel
2605104	32 Zone Panel
2605110	8 Zone Repeater with Power Supply
2605111	16 Zone Repeater with Power Supply
2605112	32 Zone Repeater with Power Supply
2605115	8 Zone Repeater without Power Supply
2605116	16 Zone Repeater without Power Supply
2605117	32 Zone Repeater without Power Supply
2605120	2 Zone Panel (English Inserts) ** See note
2605121	4 Zone Panel (English Inserts) ** See note
2605122	8 Zone Panel (English Inserts) ** See note
2605123	16 Zone Panel (English Inserts) ** See note
2605124	32 Zone Panel (English Inserts) ** See note
2605130	8 Zone Repeater Panel with Power Supply (English Inserts) ** See note
2605131	16 Zone Repeater Panel with Power Supply (English Inserts) ** See note
2605132	32 Zone Repeater Panel with Power Supply (English Inserts) ** See note
2605135	8 Zone Repeater Panel without Power Supply (English Inserts) ** See note
2605136	16 Zone Repeater Panel without Power Supply (English Inserts) ** See note
2605137	32 Zone Repeater Panel without Power Supply (English Inserts) ** See note
2605070	Clock Module Kit

Notes** Contact your supplier for current list of language translation inserts.

Figure 2 - Precept[en] external view- semi flush boxes

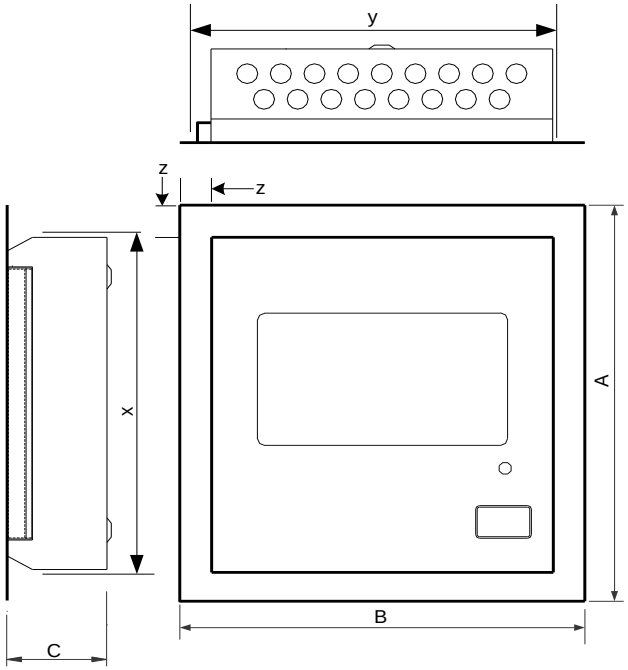


	2/4/8/16 zone panel	32 zone panel	8/16 zone repeater	32 zone repeater
Top entry 20mm knock outs	26	32	26	32
Dim A [mm]	433	504	433	504
Dim B [mm]	388	463	388	463
Dim C [mm]	100	105	100	105
Dim x [mm] Hole height	380	451	380	451
Dim y [mm] Hole width	340	415	340	415
Dim z [mm]	30	30	30	30

4.1.2 Semi-flush Panel Order Codes & Descriptions

Part Number	Description
2603011	Semi-flush bezel to fit Precept[en] 2/4/8 & 16 zone control panels
2603012	Semi-flush bezel to fit Precept[en] 32 zone control panel

Figure 3 - Precept[en] external view- fully flush boxes



	2/4/8/16 zone	32 zone	8/16 zone repeater	32 zone repeater
Top entry 20mm knock outs	26	32	26	32
Dim A [mm]	411	482	411	482
Dim B [mm]	428	503	428	503
Dim C [mm]	126	131	126	131
Dim x [mm] Hole height	380	451	380	451
Dim y [mm] Hole width	380	455	380	455
Dim z [mm]	50	50	50	50

4.1.3 Precept[en] Fully Flush Panel Order Codes and Descriptions

Part No	Description
2603060	Fully-flush painted bezel to fit 2/4/8/16 zone panels (painted to customer's specification)
2603061	Fully-flush stainless steel bezel to fit 2/4/8/16 zone panels (brushed or polished)
2603062	Fully-flush brass bezel to fit 2/4/8/16 zone panels (brushed or polished)
2603065	Fully-flush painted bezel to fit 32 zone panel (painted to customer's specification)
2603066	Fully-flush stainless steel bezel to fit 32 zone panel (brushed or polished)
2603067	Fully-flush brass bezel to fit 32 zone panel (brushed or polished)

4.2 Panel Description

The panels consist of the modules shown in the internal views depicted in Figure 4, Figure 5 and Figure 6.

Figure 4 - 2/4 Zone Precept[en] panel main components

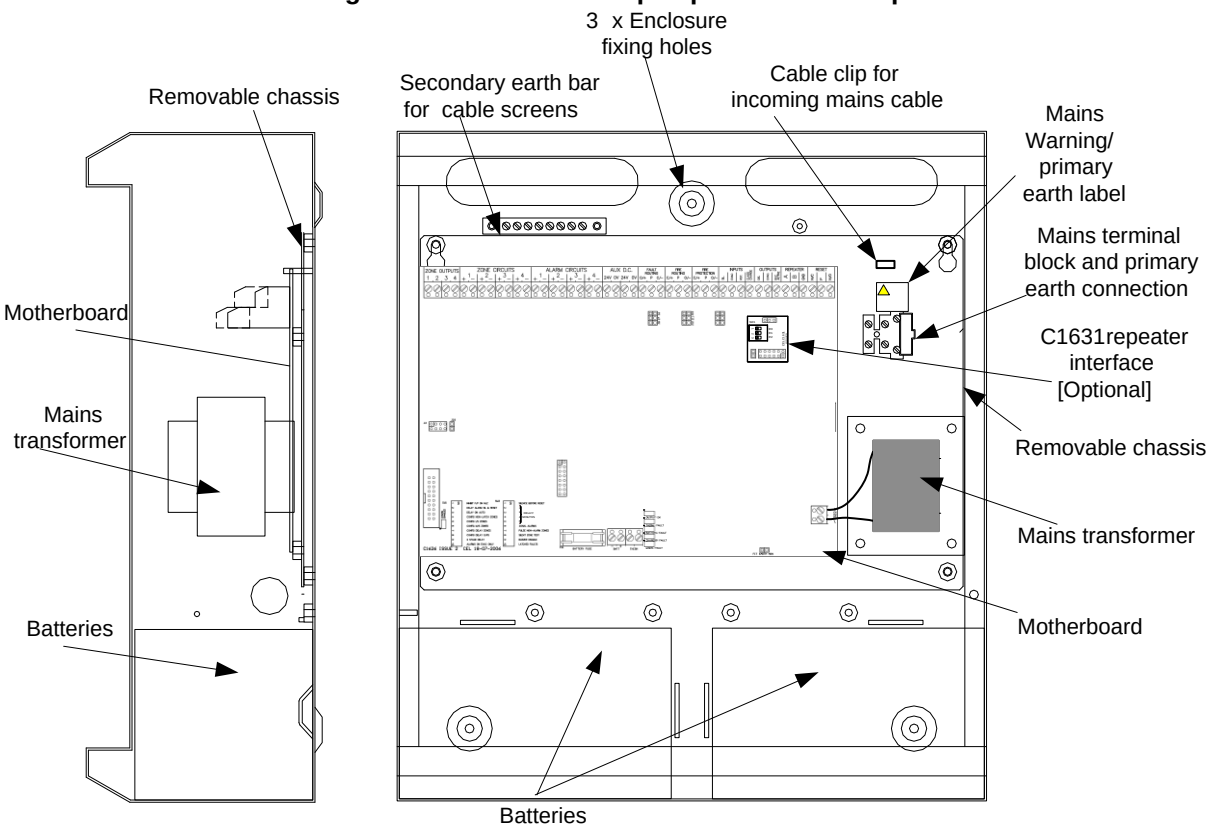


Figure 5 - 8/16 Zone Precept[en] panel main components

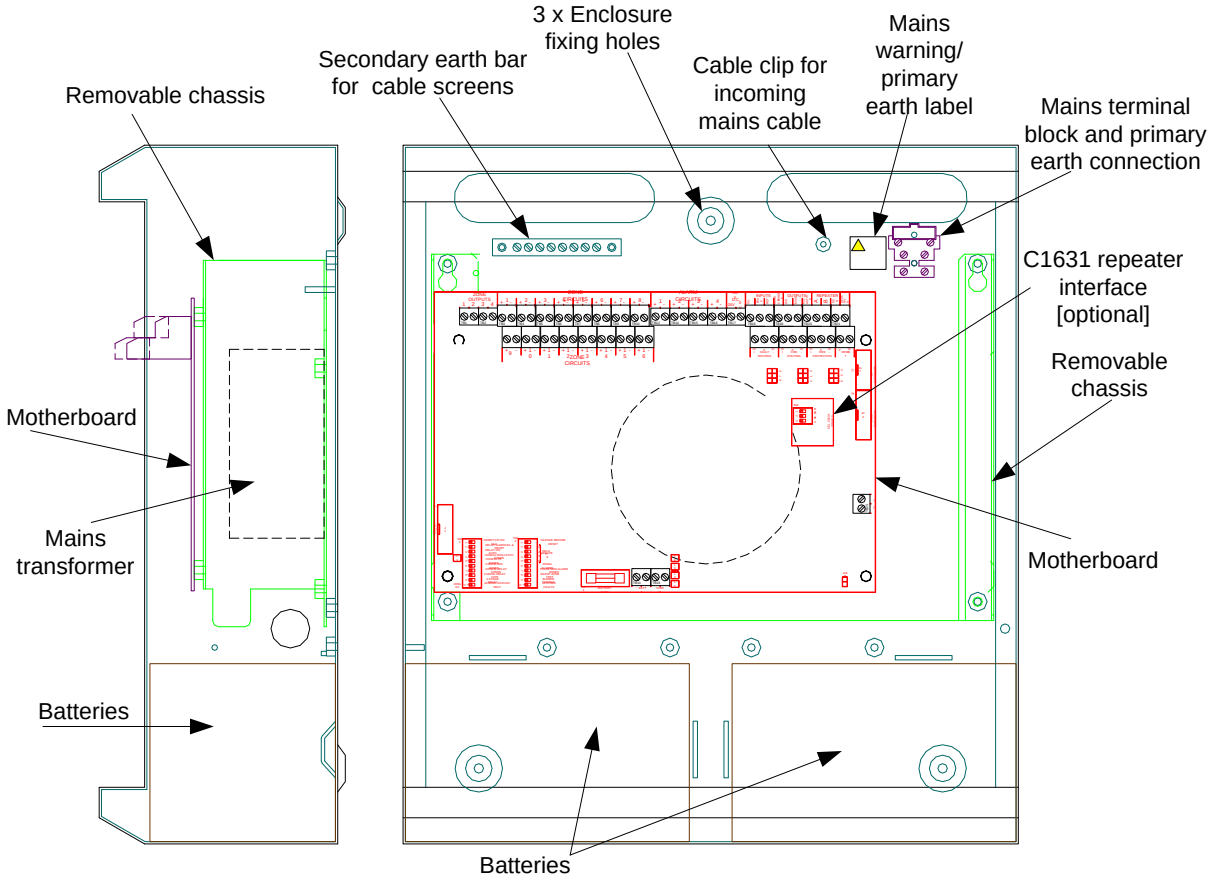
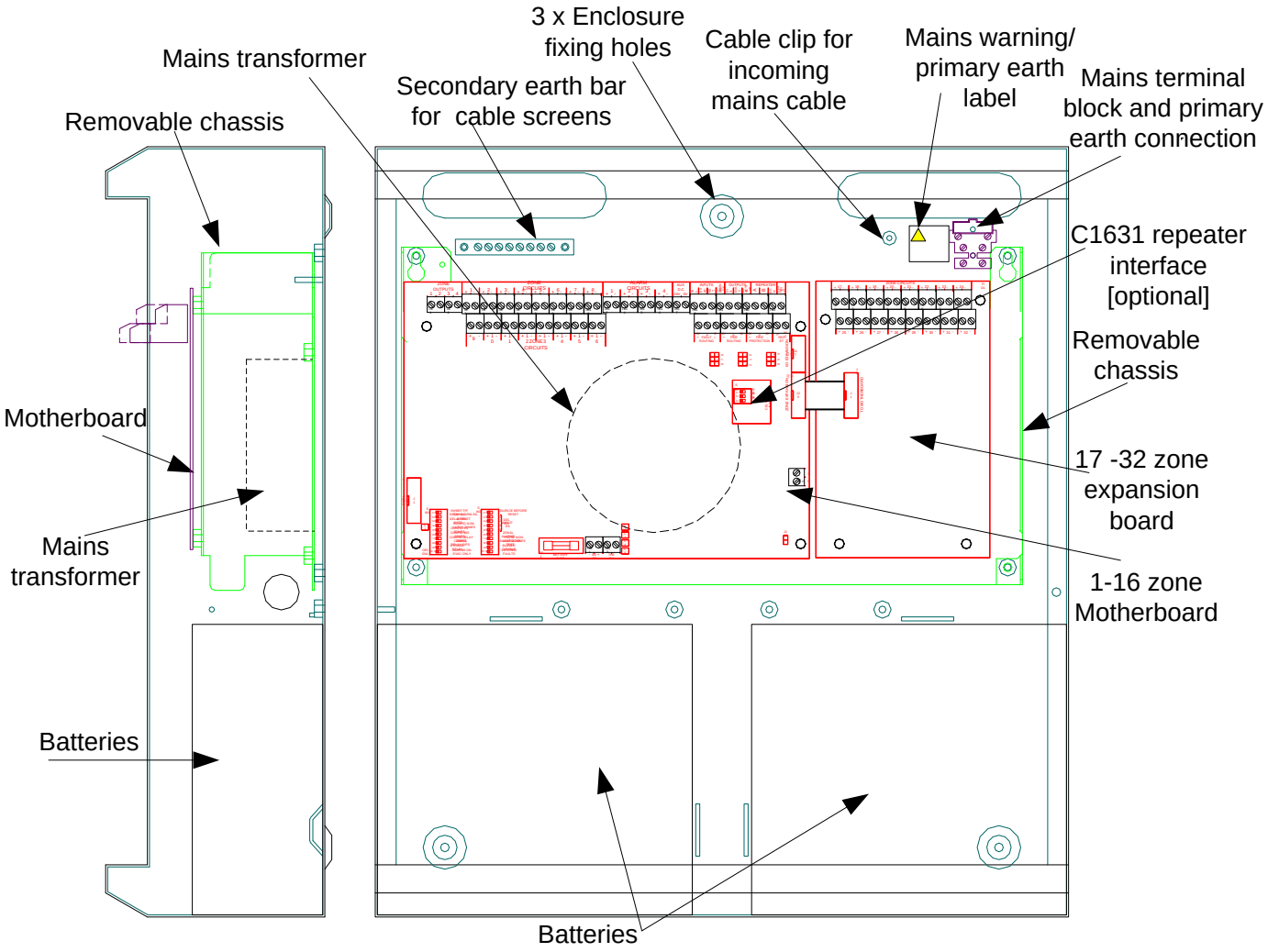


Figure 6 - 32 Zone Precept[en] panel main components



4.2.1 C1626 2/4 Zone Motherboard

This board is common to the 2 & 4-zone panels. It is also used, in a depopulated form, as the motherboard for the range of repeaters.

It provides terminals for all the field wiring, interface connectors for the repeater and connections to the display board. The power supply components for the panels and mains powered repeaters are located on this PCB. The microcontroller (including Firmware and RAM) and all of the site-specific configuration features (DIL switch & EEPROM) are accommodated on this board.

4.2.2 C1627 8/16/32 Zone Motherboard

This board is common to the 8, 16 and 32-zone panels. It is also used, in a depopulated form, as the motherboard for the range of repeaters.

It provides terminals for all the field wiring, interface connectors for the repeater, zonal expansion connectors and connections to the display board. The power supply components for all panels except the 32-zone panel are located on this PCB. The microcontroller (including Firmware and RAM) and all of the site-specific configuration features (DIL switch & EEPROM) are accommodated on this board.

4.2.3 C1632 16 Zone Expansion Board

This board provides an additional 16 detection zones. It is connected to the C1627 motherboard via a ribbon cable to provide a total of 32 zones for the 32-zone panel.

4.2.4 C1628 16 Zone Display Board and C1629 32 Zone Display Board.

These boards provide visible [LED] user indications and user buttons. The display board connects to the motherboard via a ribbon cable.

4.2.5 C1631 Repeater Interface Board

This optional plug-in board provides an RS485 capability for communication with up to 5 repeaters and is fitted to the C1627 motherboard via two connectors. One C1631 needs to be fitted to the fire alarm panel and one to each repeater.

4.3 Panel assembly

See exploded general assembly drawings Figure 7, Figure 8 and Figure 9.

Figure 7 - 2/4 Zone Precept[en] panel- General Assembly [with optional clock/timer module]

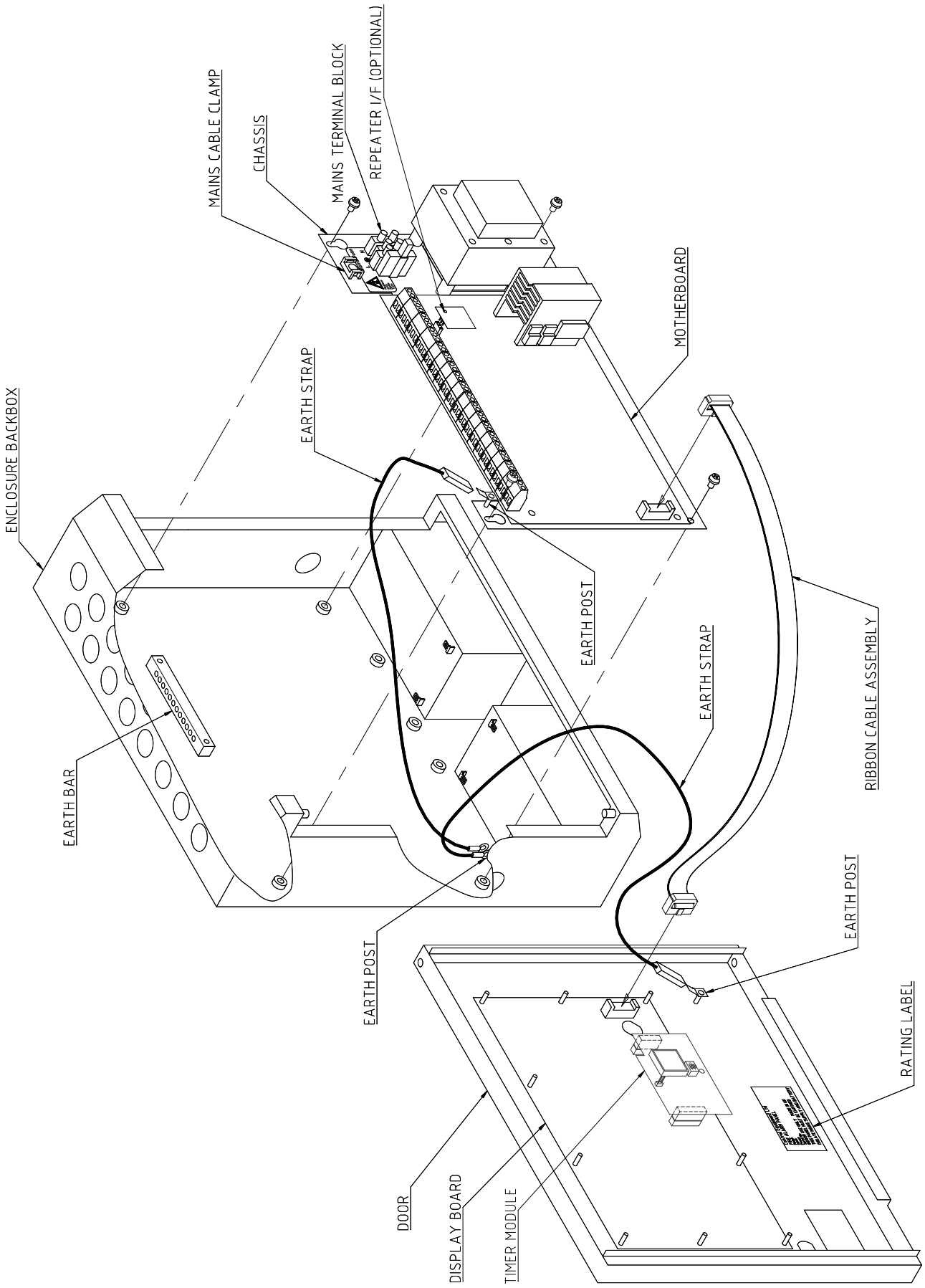


Figure 8 - 8/16 Zone Precept[en] panel- General Assembly [with optional clock/timer module]

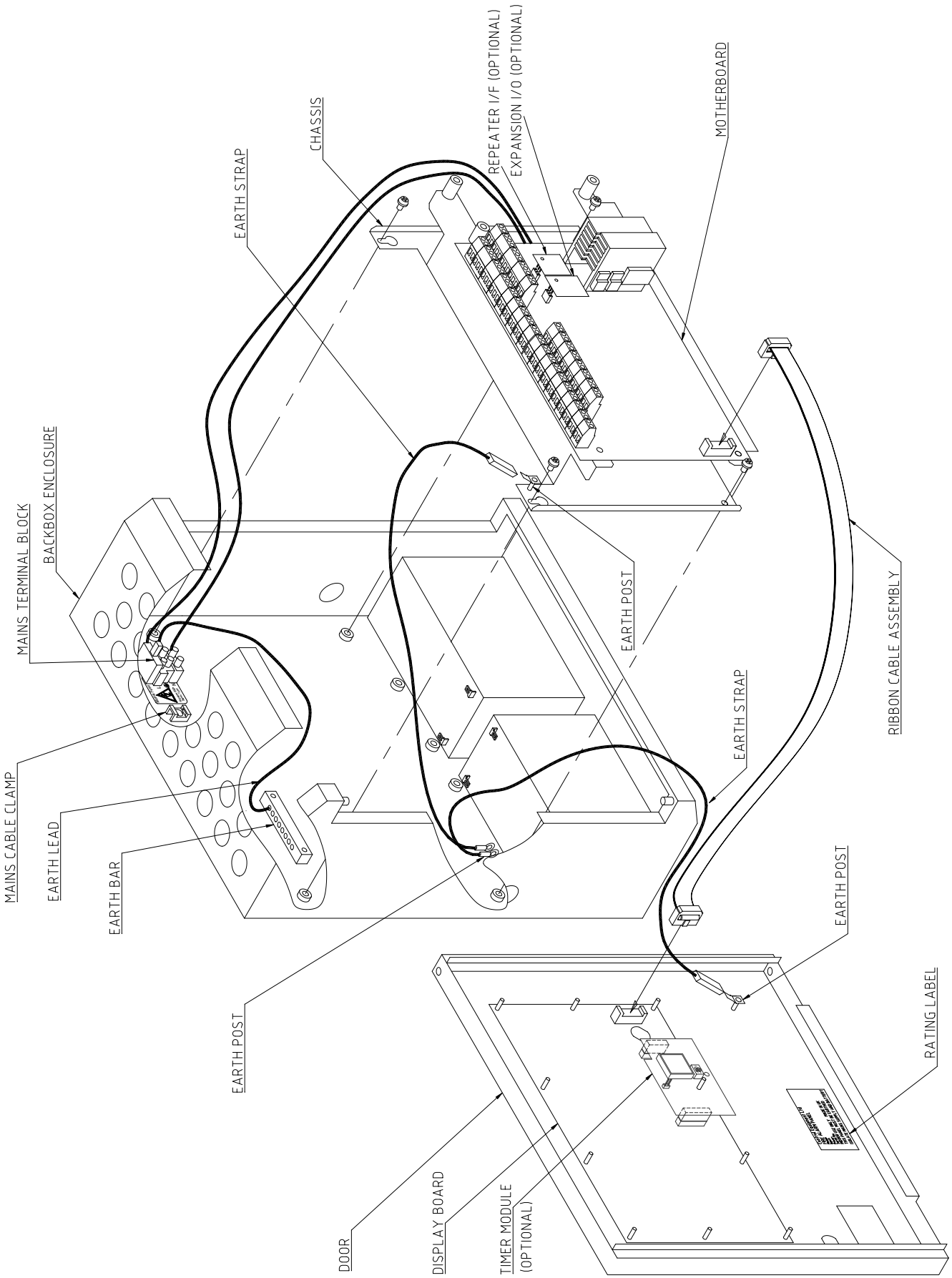
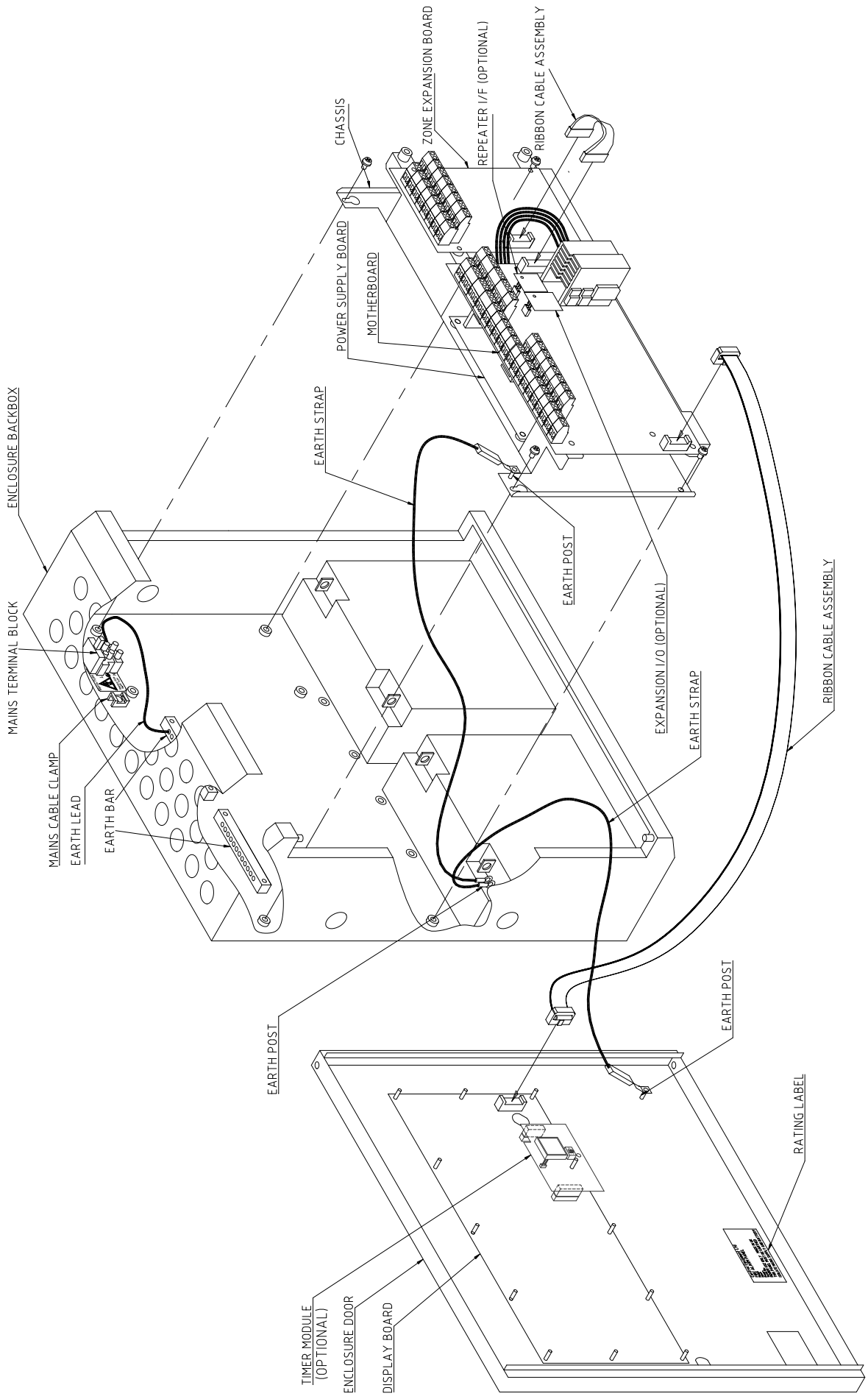


Figure 9 - 32 Zone Precept[en] panel- General Assembly [with optional clock module]



4.4 Precept[en] panel range

Panel	Enclosure Type and Dimensions [H x W x D mm]	PSU (230Vac)	Internal SLA Battery
2/4 zone	2 [370 x 325 x 126]	1.5A	24V 3Ah
8 zone	2 [370 x 325 x 126]	3A	24V 12Ah
16 zone	2 [370 x 325 x 126]	3A	24V 12Ah
32 zone	3 [441 x 400 x131]	5A	24V 18Ah

4.5 Precept[en] Repeater Description

The repeater consists of the same PCB modules and enclosures as used in the Precept[en] fire alarm panel. The components for the redundant motherboard I/O [zones, alarm circuits etc] are not fitted to the repeater motherboard. The mechanical arrangement is identical. The C1631 Repeater interface card must to be fitted to the repeater motherboard.

Repeater	Enclosure Type and Dimensions [H x W x D mm]	PSU (230Vac)	Internal SLA Battery
2-8 zone	2 [370 x 325 x 126]	1.5A	24V 3Ah
16 zone	2 [370 x 325 x 126]	1.5A	24V 3Ah
32 zone	3 [441 x 400x131]	1.5A	24V 3Ah

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5. Functional Specification

5.1 Panel Input/Output List

Input/Output	Precept[en] Panel				
	2 zone	4 zone	8 zone	16 zone	32 zone
Detection zones	2	4	8	16	32
Remote silence alarm I/P [non monitored]	1	1	1	1	1
Remote reset I/P [non-monitored]	1	1	1	1	1
Remote evacuate I/P [non-monitored]	1	1	1	1	1
Class change I/P [non-monitored]	1	1	1	1	1
Sounder circuits	2 @ 0.5A	4 @ 0.5A	4 @ 1A	4 @ 1A	4 @ 1A
Zonal O/Ps [open collector]	2	4	Optional[1]	Optional[1]	Optional[1]
Disablement active [open collector]	1	1	1	1	1
Evacuate active [open collector]	1	1	1	1	1
Buzzer active [open collector]	1	1	1	1	1
Monitored Fire Routing O/P	1	1	1	1	1
Monitored Fire Protection O/P	1	1	1	1	1
Monitored Fault Routing O/P	1	1	1	1	1
Volt free reset relay	1	1	1	1	1
Aux DC Supply [fused]	1 @ 0.5A	1 @ 0.5A	1 @ 1A	1 @ 1A	1 @ 1A
Repeater facility	Optional[2]	Optional[2]	Optional[2]	Optional[2]	Optional[2]

NOTES:

[1]- The 8, 16 & 32 zone panels have zonal outputs for zones 1 to 4 only. Additional outputs can be added via the output expansion boards. An Output Module communication interface board is also required in the panel.

[2]- The use of repeaters requires the addition of a Repeater communication interface board.

5.2 Features List

Switching regulator power supplies with temperature compensated battery charging	High efficiency voltage regulation. Battery charging voltage is automatically adjusted between 28.6 and 26.72Vdc over an ambient temperature range of -10 to +50^{o}C.
Battery disconnect	Protects the battery from permanent damage due to over discharge by automatically disconnecting it when the battery voltage falls to 21Vdc.
Battery Resistance Check	Batteries are monitored for high resistance. A fault indication is given if the resistance exceeds the following values: 1Ω - 2/4-zone panels & repeaters 0.6Ω - 8/16-zone panels 0.35Ω - 32-zone panels
Class change input	Operates all sounders for up to 5 seconds.
Configurable detection zones	Simple and flexible display-based configuration process allowing detection zones to be configured for any of the following: o Latching or non-latching Fire indication. o Delayed or non-delayed Output operation. o Normal or Intrinsically-Safe zone monitoring. o Short Circuit = Fault or Short Circuit = Fire **Factory configuration**: Latching, non-delay, standard [non-I.S.], S/C = Fault.
Active fault monitoring on detection zones. [Non-Intrinsically Safe applications only]	Reduces zone monitoring current and therefore reduces the required battery capacity. Maintains zone wiring continuity following the removal of a detector, while still providing a fault indication on the panel.
Selectable Zonal or General alarm sounder operation with sounders in alert or silent in adjacent zones.	Selectable via DIL switches on the motherboard. The standard sounders on the 2 and 4 zone panels can be used in General or Zonal modes. [These sounders always operate in General mode on 8, 16 and 32 zone panels regardless of DIL switch setting]. The output expansion system provides additional sounder circuits for General or Zonal use on the 8, 16 and 32 zone panels.
Configurable Fire Routing, Fire Protection and Fault Routing output relays	Configuration Links on the motherboard allow each Output Relay to be individually selected to the EN54 powered/fault-monitored mode or non-EN54-compliant volt-free changeover contacts. **Factory configuration**:-Fully Monitored (EN54 Mode).
Reset Relay	A volt-free changeover contact operating for 10 seconds on panel fire alarm reset.
Auxiliary 24V DC power supply output	Protected by an electronic fuse. Operation of the fuse is indicated on the display. The fuse is reset by pressing the Reset button on the display.
Open collector outputs	o Evacuate active. o Buzzer Active. o Disablement Active. o Zonal fire for each zone up to zone 4 [Zonal output expansion on 8-32 zone versions via output boards later].
Remote inputs	Remote Evacuate. Remote Silence Alarms. Remote Reset.

Earth Fault monitoring	Can be disabled via a link on the motherboard.
Zone/Output disablement feature	The following circuits can be independently disabled/enabled: o Each Zone o Fire Routing o Fire Protection o Fault Routing o All Sounder Circuits
One Man Zone Test	Each zone can be independently set to the One Man test condition. Sounders can be configured to either operate briefly to confirm the panel has detected the test fire or no sounder operation during the test fire.
One Man Sounder Test	Operates the sounders intermittently.
Configurable Delay Mode Facility	Flexible system allows: o Any zone to be configured as a delay zone. o Single-stage or two-stage delay. o Selectable 1 to 10 minute delay period [for single-stage and two-stage delay modes]. o Selection of the outputs to be delayed [Fire Routing and/or Fire Protection and/or Sounders]- can be any combination.
Clock Module [Optional]	Plug in LCD unit providing either: o Day/night delay control with or without fire event counter. or o Time of fire event with or without fire event counter.
Other configuration features	o Prevent the Fire Protection output operating from a fire condition on a “Non-Latch” zone. o Inhibit the silencing and resetting of the panel for 3 minutes following the occurrence of a fire alarm. o Set the sounders to operate only when the panel is in the Evacuate condition. o Inhibit the resetting of the fire alarm condition until the alarm sounders have been silenced. o Disable the internal panel buzzer. o Select latching fault mode where all fault conditions latch until the panel is manually reset. o Restore factory default configuration of zones and outputs to be delayed.
Repeater panels	Support for up to 5 repeater panels via two-wire RS485 serial communication.

6. Precept[en] C1627 Motherboard Features

Figure 10 illustrates the motherboard features referred to elsewhere in the documentation.

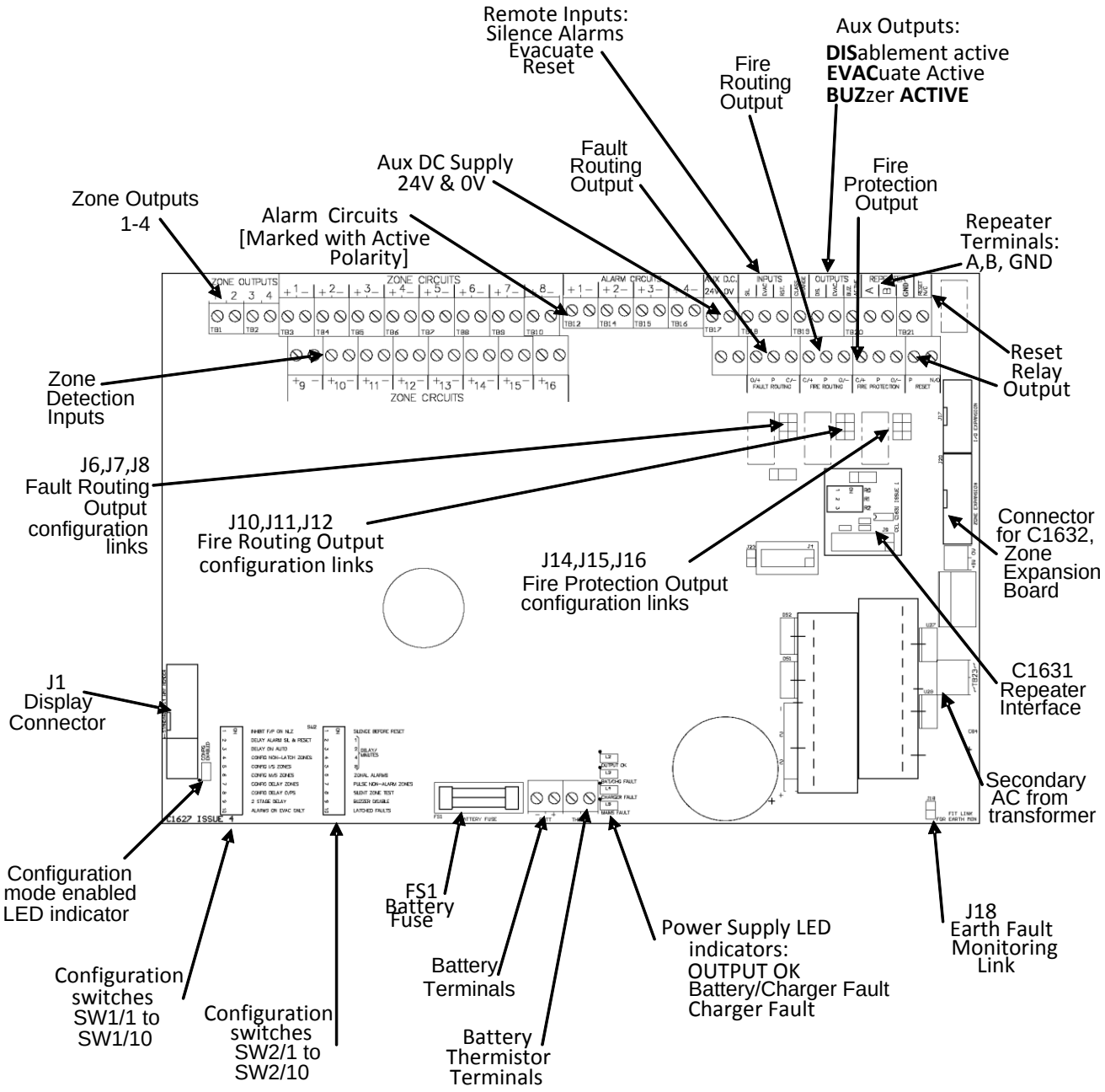


Figure 10 - C1627 Precept[en] motherboard layout

7. Precept[en] C1632 16 zone expansion board Features

Figure 11 llustrates the motherboard features referred to elsewhere in the documentation

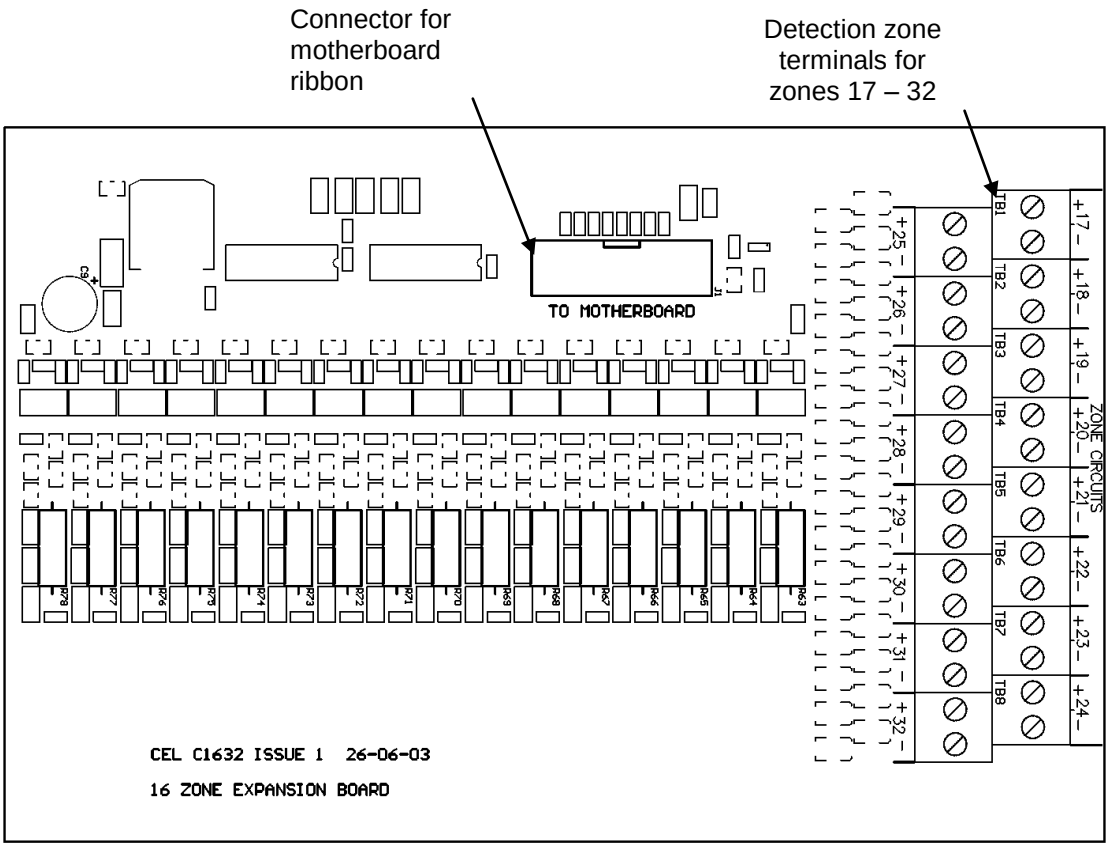


Figure 11 - Precept[en] C1632 16 zone expansion board

8. Power Supplies

The 1.5A, 3A and 5A power supplies provide 27.1V nominal at load currents of up to 1.5A, 3A and 5A respectively and are designed in accordance with the requirements of EN54-4.

The Precept[en] 2, 4, 8 and 16 power supplies are contained on the C1631 motherboard, see Figure 10. The Precept[en] 32 zone panel power supply is on a separate board (C1652) mounted inside the fire alarm panel enclosure, see Figure 12.

8.1 Battery Charger

Each power supply provides a temperature-compensated charging voltage for sealed-lead-acid 12V batteries connected in series. Charging voltage range is 26.72V @ 50°C to 28.25V @ -10°C.

Battery sizes are:

2 off 12V, 3Ah for the 1.5A supply

2 off 12V, 7Ah or 12 Ah for the 3A supply

2 off 12V, 18Ah for the 5A supply

The health of the batteries, the battery connections and fuse are checked by a battery monitor circuit and automatic battery test facility once every 30 seconds. If the Battery is disconnected or the Battery voltage falls below 15.7V or the Battery and inter-connection resistance is greater than or equal to 1Ω, the Batt/Charge fault LED is illuminated and the Fault Output is operated. The circuitry also protects against reversed connection of the batteries.

8.2 Visual indications

The following visual indications are provided on the power supply:

1) A green **'Output- OK'** LED. This simply indicates that power is being supplied to the load.

2) A yellow **'Batt Charge Fault'** LED indicating any of the following conditions:
   a) Battery or associated wiring disconnected
   b) Battery fuse blown
   c) Low Battery voltage (<15.7V ±0.4V)
   d) Battery and interconnection resistance is equal to or higher than:
      - 1Ω - 2/4-zone panels & repeaters
      - 0.6Ω - 8/16-zone panels
      - 0.35Ω - 32-zone panels

3) A yellow **'Charger Fault'** LED (**'Internal Fault'** LED on the C1652 PSU board) indicating any of the following:
   a) A mains fault exists (described below)
   b) The Switching regulator or charger circuitry is malfunctioning
   c) Battery Fuse is blown
4) A yellow **'Mains Fault'** LED. This indicates that the mains voltage has failed or is less than the required minimum for correct operation of the power supply (80% of the rated voltage).

8.3 Fault Outputs

All PSU fault conditions are internally communicated to the panel motherboard, which will raise a fault indication on the display.

8.4 Battery Disconnect

The power supply provides a battery disconnect facility that disconnects the batteries when the battery terminal voltage falls below 21.2V ±0.53V. This will occur under the following conditions:

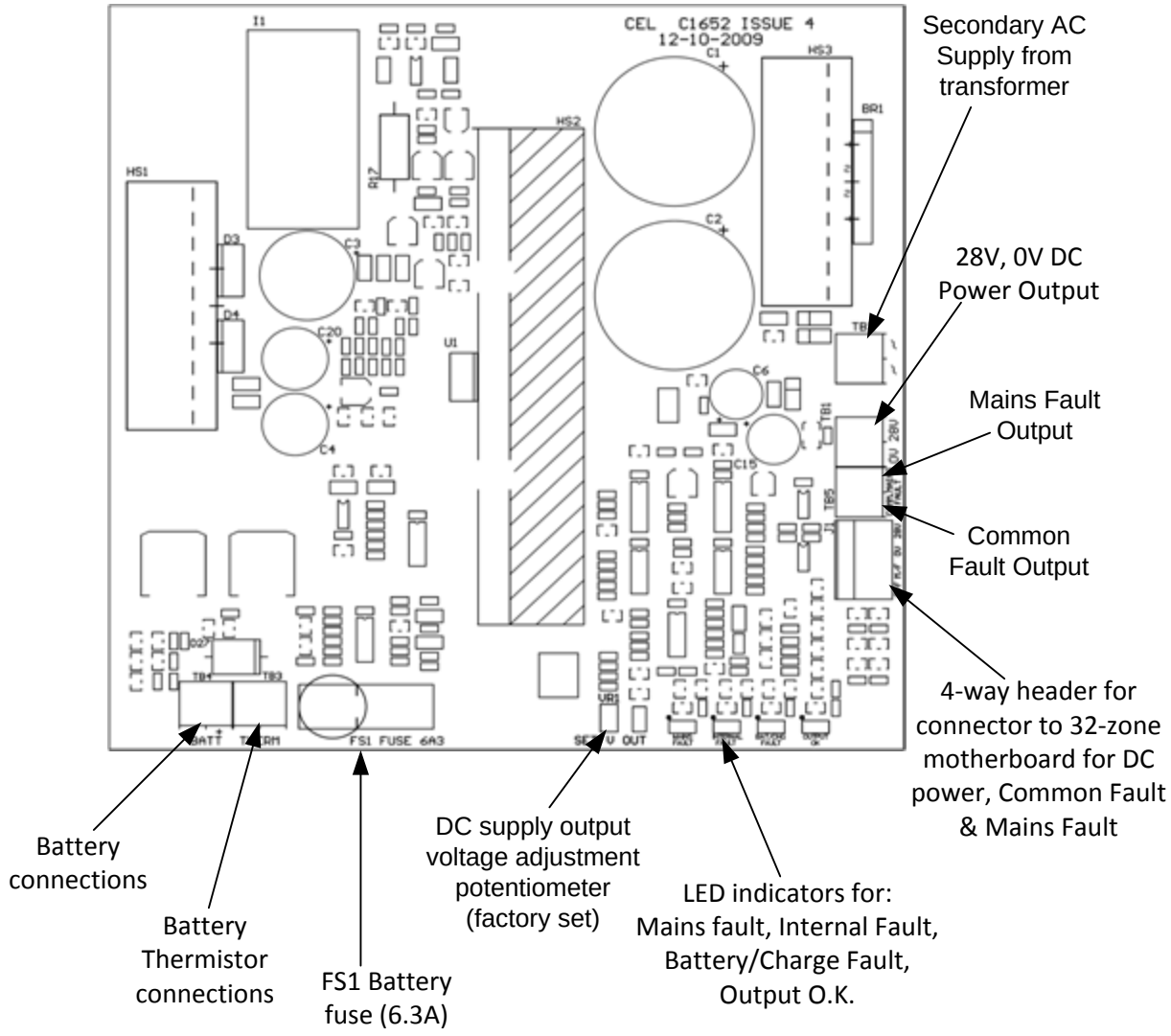
1) A short circuit across the battery terminals
2) To prevent deep discharge of the batteries if supplying the panel for an abnormally long period of time.

The batteries are reconnected when the mains voltage is present and the battery voltage is greater than 18.5V ±0.46V.

8.5 32 Zone Precept[en] Power Supply Features And Connections

Figure 12 shows the layout of the 32-zone Precept[en] panel power supply.

Figure 12 - 32-zone Precept[en] power supply layout


CEL C1652 ISSUE 4
12-10-2009
Secondary AC Supply from transformer
28V, 0V DC Power Output
Mains Fault Output
Common Fault Output
4-way header for connector to 32-zone motherboard for DC power, Common Fault & Mains Fault
Battery connections
Battery Thermistor connections
FS1 Battery fuse (6.3A)
DC supply output voltage adjustment potentiometer (factory set)
LED indicators for: Mains fault, Internal Fault, Battery/Charge Fault, Output O.K.

9. Compatible Field Devices

The Precept[en] panels are compatible with the devices listed below:

9.1 Field Device Order Codes & Descriptions

Manufacturer	Part no.	Description	CEL Part No	Max. per zone [See Notes below]
Apollo	55000-200	Series 60 ionisation detector	2501-104	32
Apollo	55000-210	Series 60 integrating ion detector	N/A	32
Apollo	55000-100	Series 60 Grade 1 heat detector	2501-106	32
Apollo	55000-101	Series 60 Grade 2 heat detector	2501-107	32
Apollo	55000-102	Series 60 Grade 3 heat detector	2501-108	32
Apollo	55000-103	Series 60 Range 1 heat detector	2501-109	32
Apollo	55000-104	Series 60 Range 2 heat detector	2501-110	32
Apollo	55000-300	Series 60 optical detector	2501-105	32
Apollo	55000-380	Series 60 optical/heat detector	N/A	32
Apollo	45681-200	Series 60 mounting base	2501-105	-
Apollo	TBA	Orbis conventional (Replaces S60) Optical	N/A	32
Apollo	TBA	Orbis conventional (Replaces S60) Heat	N/A	32
Apollo	TBA	Orbis conventional (Replaces S60) Multi-sensor	N/A	32
Apollo	TBA	Orbis conventional base	N/A	-
Hochiki	SLR-E	CDX Range optical detector	N/A	32
Hochiki	SIJ-E	CDX Range ionisation detector	N/A	32
Hochiki	DFJ-60E	CDX Range 60 heat detector	N/A	32
Hochiki	DFJ-90E	CDX Range 90 heat detector	N/A	32
Hochiki	DCD-1E	CDX Range Grade 1 heat detector	N/A	32
Hochiki	DCD-2E	CDX Range Grade 2 heat detector	N/A	32
Hochiki	DCD-R1E	CDX Range R1 heat detector	N/A	32
Hochiki	YBN-R/4SK	CDX Range mounting base	N/A	32
Hochiki	YBO-R5	CDX Range mounting base, c/w remote indicator	N/A	32
Hochiki	YBO-5SK	CDX range mounting base, c/w remote indicator & diode	N/A	32
Hochiki	YBN-R4	CDX range mounting base, no diode	N/A	32
Nittan	TBA	New Evolution conventional Ionisation	N/A	32
Nittan	TBA	New Evolution conventional optical	N/A	32
Nittan	TBA	New Evolution conventional heat	N/A	32
Nittan	TBA	New Evolution conventional Optical/heat	N/A	32
Nittan	TBA	New Evolution base	N/A	32
KAC	WR2072-470	Manual call point	N/A	No limit
Apollo	53541-151	Series 30 ionisation detector	N/A	32
Apollo	53531-221	Series 30 Grade 1 heat detector	N/A	32
Apollo	45681-007	Series 20/30 mounting base	N/A	32
Apollo	55000-217	Series 65 ionisation detector	N/A	32
Apollo	55000-317	Series 65 Optical detector	N/A	32
Apollo	55000-122	Series 65 heat detector A1R	N/A	32
Apollo	55000-125	Series 65 heat detector BR	N/A	32
Apollo	55000-132	Series 65 heat detector CR	N/A	32
Apollo	55000-137	Series 65 heat detector CS	N/A	32
Apollo	55000-212	Series 60 IS ionisation detector	N/A	10
Apollo	55000-213	Series 60 IS integrating ionisation detector	N/A	10
Apollo	55000-110	Series 60 IS grade 1 heat detector	N/A	10
Apollo	55000-111	Series 60 IS grade 2 heat detector	N/A	10
Apollo	55000-112	Series 60 IS grade 3 heat detector	N/A	10

Manufacturer	Part no.	Description	CEL Part No	Max. per zone [See Notes below]
Apollo	55000-113	Series 60 IS range 1 heat detector	N/A	10
Apollo	55000-114	Series 60 IS range 2 heat detector	N/A	10
Apollo	45681-207	Series 60 IS base	N/A	10
Hochiki	SIH-E	CD Range ionisation detector	N/A	32
Hochiki	DFE-60E	CD Range 60 heat detector	N/A	32
Hochiki	DFE-90E	CD Range 90 heat detector	N/A	32
Hochiki	DCC-1EL	CD Range Grade 1 heat detector	N/A	32
Hochiki	DCC-2EL	CD Range Grade 2 heat detector	N/A	32
Hochiki	DCC-1REL	CD Range R1 heat detector	N/A	32
Hochiki	YFB-RL\4H5	Mounting base	N/A	32
Hochiki	YBK-RL/4H1	CD Range mounting base	N/A	32
Hochiki	DFG-E	Waterproof Fixed Temp. (60) Heat Detector- No Base Req.	N/A	32

Notes:

The Precept[en] panel is designed to monitor 22µF capacitors as end-of-line devices on the zones. If the zone is configured as an Intrinsically Safe zone then the end-of- line device must be changed to a 10k resistor. In this case the following limitation must be observed:

- The total current drawn by detectors on a zone must not exceed 1.2mA, otherwise the panel may not detect an open circuit fault on the zone wiring. The standby current drawn by each device will be given in the manufacturer's datasheet for the device. To calculate the total number of devices that may be connected to a zone, add up the individual standby current values for each device and make sure that the total current does not exceed 1.2mA, including the current drawn by the I.S. barrier.
- If a galvanic isolator (MTL5061) is used on the zone then this device will draw current. Allow at least 0.1mA for the barrier (this could rise to 0.4mA depending on how much current is drawn by the detectors).
- The maximum number of devices per zone must not exceed 32, regardless of standby current.

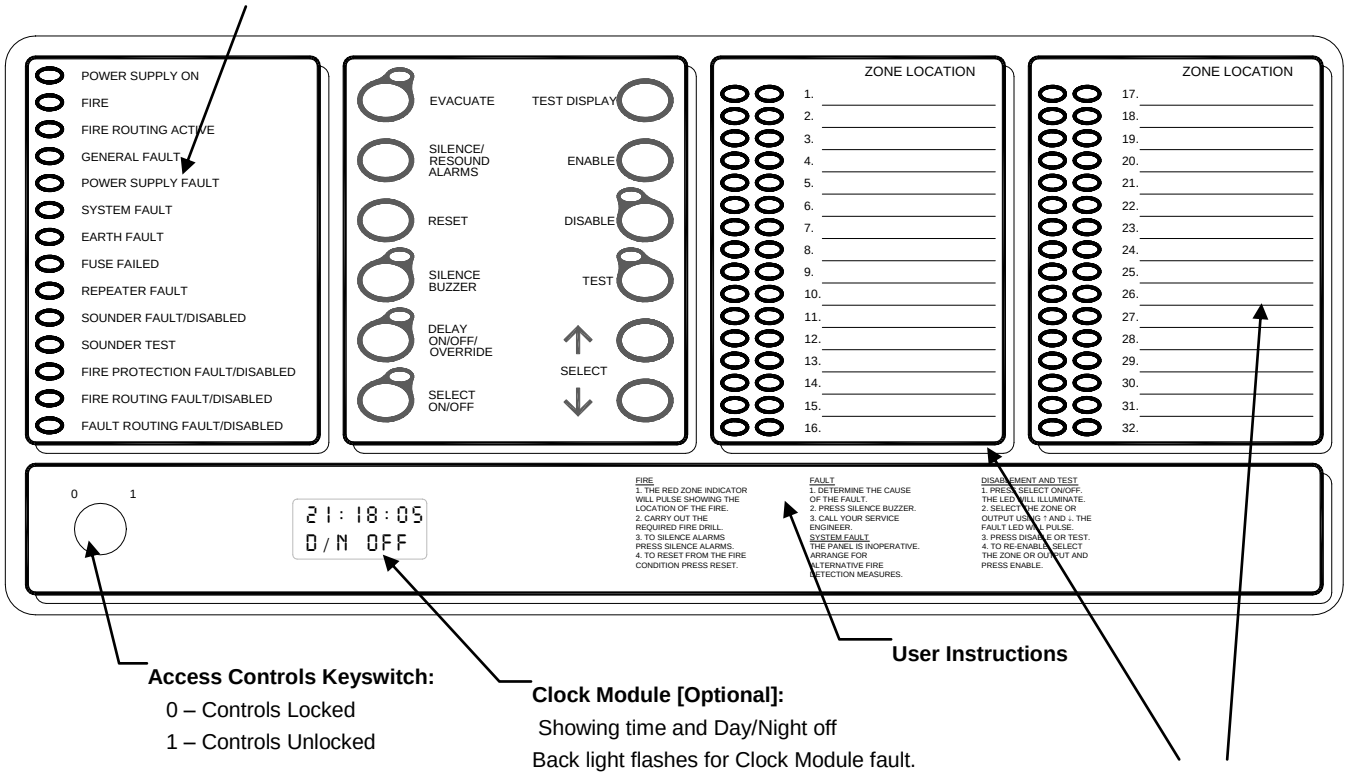
The values in the above table are for guidance only and will vary for individual detectors. Each zone should be fully checked for correct fault monitoring during installation & commissioning.

10. Overview Of User Functions

This section gives an overview of the functions available to the end user.

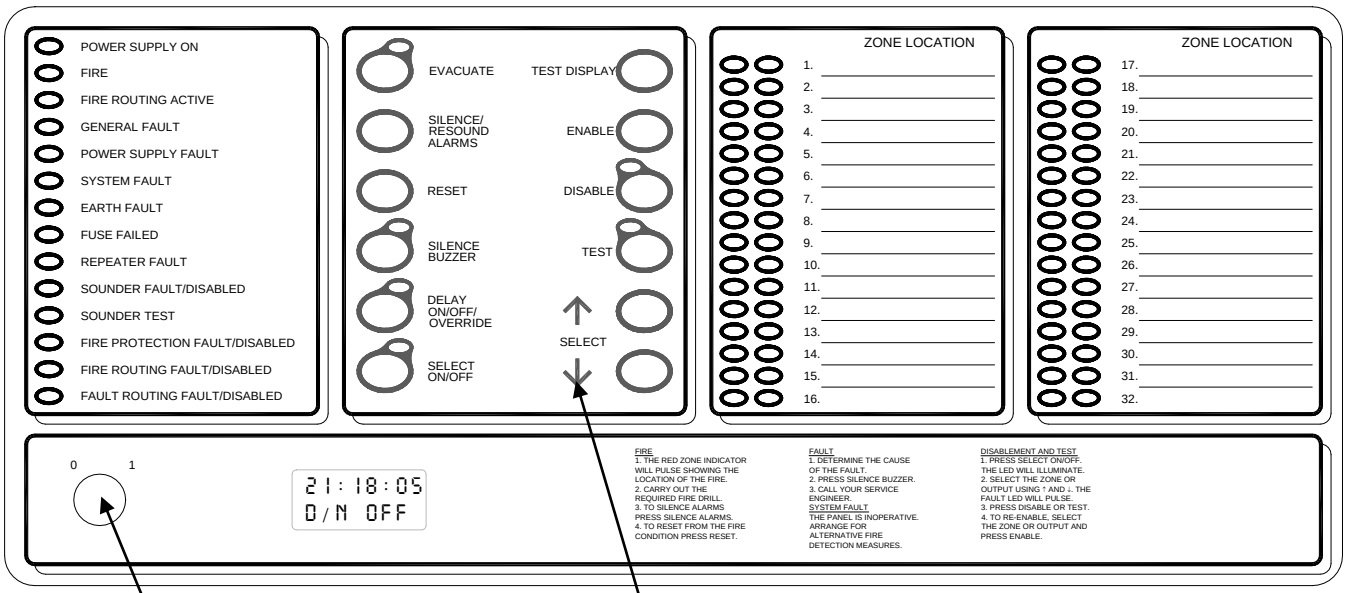
10.1 User Indications

General Indicator Section		
Indicator Description	**Indication Colour**	**Operating Condition**
Power Supply On	Green	Illuminates Steady for Mains or Standby power On.
Fire	Red	Flashes on any new fire alarm condition, changing to a steady indication on operation of Silence Alarms.
Fire Routing Active	Red	Illuminates Steady when the Fire Routing Output is active.
General Fault	Yellow	Flashes for any fault condition.
Power Supply Fault	Yellow	Flashes for mains or standby power supply/charge fault
System Fault	Yellow	Illuminates Steady to indicate Microcontroller or Memory Failure. Flashes to indicate Engineer's Configuration Mode active.
Earth Fault	Yellow	Flashes for any positive or negative power supply earth fault.
Fuse Fault	Yellow	Flashes for any auxiliary supply fuse failure
Repeater Fault	Yellow	Flashes for any Repeater fault or repeater communication fault,
Sounder Fault/Disabled	Yellow	Flashes for any sounder fault. Steady for sounders disabled.
Sounder Test	Yellow	Illuminates Steady while sounder walk test is active.
Fire Protection Fault/Disabled	Yellow	Flashes for a fault on the Fire Protection Output. Steady when Fire Protection Output is disabled.
Fire Routing Fault/Disabled	Yellow	Flashes for a fault on the Fire Routing Output. Steady when Fire Routing Output is disabled.
Fault Routing Fault/Disabled	Yellow	Flashes for a fault on the Fault Routing Output. Steady when Fault Routing Output is disabled.



Zone Location Indications		
Indicator Description	**Indication Colour**	**Operating Condition**
User Generated Zone Location Text	Red	Flashes when zone is in a fire condition, turning to steady on operation of Silence Alarms.
User Generated Zone Location Text	Yellow	Flashes when zone is in a fault condition. Illuminates steady when zone is disabled or in test.

10.2 User Controls



Access Controls Keyswitch:

0 – Controls Locked

1 – Controls Unlocked

Switch Description	Functionality	Button Availability
Evacuate	Operates all sounders continuously and lights the Evacuated LED adjacent the button until the silence button is operated	When controls are unlocked
Silence/Resound Alarms	Following a fire alarm condition, 1st operation stops sounders. The General Fire LED and the Zonal fire LED will change from flashing to steady. 2nd operation restarts the previously silenced sounders	When controls are unlocked
Reset	Clears the panel display, resets the zones, outputs and operates the reset relay.	When controls are unlocked and [if silence before reset is configured] alarms silence switch has been operated.
Silence Buzzer	1] Press to stop the buzzer sounding in fire or fault conditions. 2] In 2 Stage Delay Mode, with stage 1 delay running, press to start stage 2 delay otherwise all delayed outputs operate when Stage 1 timer times out.	When controls are locked or unlocked When the panel is in the fire condition and the delay is running. Controls are locked or unlocked
Delay On/Off/Override	1] Press once to Enable the delay mode, lighting the adjacent delay on LED. Press again to disable the delay mode and turn off the LED 2] Overrides the delay when delay is running. All delayed outputs will operate immediately.	1] When controls are unlocked and delay period is set to a value > 0. 2] When the panel is in the fire condition and the delay is running.
Select On/Off	Enables the User select feature [Select ↑ Select ↓] for selection of zones or outputs for disablement/re-enablement also Day/Night On/Off selection and setting current time on Clock Module when fitted.	When controls are unlocked
Test Display	Press to illuminate all LEDs on the display and operate the buzzer. All indications remain active for approx 5 seconds after button release. Also displays alarm count on Clock Module [when fitted]	When controls are locked or unlocked
Enable	Press to clear the disablement or test condition on a zone or output selected via the User Select feature.	When controls are unlocked, the Select switch has been operated and a zone or output has been selected.
Disable	Press to disable a zone or output selected via the User Select feature.	As above.
Test	Press to initiate the One Man Test on sounders or zones as selected via the User Select feature.	As above.
Select ↑ Select ↓	Used to scroll the cursor indication through the zone and output fault LEDs on the display to select a zone or output for disablement, or test. [LED illuminated when Select Mode is active]. Also scrolls through Clock Module menu [when fitted].	When controls are unlocked and the Select switch has been operated.

10.3 Selection of Detection Zones or Outputs for Disablement, Enablement or Test

The panel provides a simple and straightforward means for selecting the sounder outputs and/or zones which are to be disabled, re-enabled or set to the test mode. The Fire Routing output, Fire Protection output and Fault Routing output can also be individually disabled and enabled.

The zone or output is selected using the Cursor Select feature. This allows the User to move a flashing cursor indication up or down through the yellow fault LEDs associated with the available zones and outputs until the required zone or output is highlighted. The yellow LED for the selected zone/output flashes in “Cursor” mode, which is easily distinguishable from all other indications. With the cursor flashing on the required zone/output, pressing the Disable button disables the zone/output. Pressing the Enable button re-enables the zone/output. Pressing the Test button initiates the test condition. [Note: Fire Routing output, Fire Protection output and Fault Routing outputs cannot be placed in test condition].

10.4 Disablement/Re-enablement of Detection Zones and Outputs

Any or all of the zones can be disabled.

The panel will not enter the fire alarm condition if a fire detection device operates on a disabled zone. Similarly, the panel will not enter the fault condition if a fault occurs on a disabled zone. The fire panel will respond normally to fire device operations and wiring faults on all enabled zones.

The following outputs can also be individually disabled/enabled:

- All Sounder circuits.
- The Fire Routing output.
- The Fire Protection output.
- The Fault Routing output.

A disabled output is prevented from operating under any circumstances.

10.5 Detector Zone One man Test.

When selected to the One Man Test condition, devices connected to the zone can be operated for test purposes without operating the Fire Routing or Fire Protection outputs. The zone[s] to be set to the One Man Test condition are selected using the Cursor Select feature described in 10.3 above. With the cursor flashing on the required zone, pressing the Test button initiates the zone test. Pressing the Enable button or pressing the Test button again clears the test condition and restores normal operation to the zone.

The features of the One Man Zone Test condition are:

- A fire condition on a zone in Test Mode will not operate any of the fire outputs other than any sounders configured to respond to the zone fire.
- The panel will respond normally to a fire condition on any zone not selected to the Test Mode.
- Sounders can be configured not to respond to a detector test or to operate for 5 seconds and then automatically silence.
- A Zone Test Fire condition will operate the sounders in accordance with the panel configuration- i.e. either:
  - Zonally - only the sounder group associated with the actual detection zone being tested

  or
  - Generally - all sounder groups operate.
- After each test the panel and the device being tested is automatically reset allowing the next device to be tested without needing to return to the panel to silence and reset.
- If a fire condition occurs on any zone other than a zone in test mode, the panel responds fully to the fire condition as per its normal fire response and configuration.

10.6 Alarm Sounder One man Test

The One Man Sounder Test operates all sounders intermittently until the Test mode is manually cleared. This allows the Engineer to walk the installation and confirm the operation of all sounders. The sounder on/off cycle is 2 seconds on and 15 seconds off to allow operation to be confirmed without being too intrusive for other occupants.

A genuine fire alarm condition overrides the test mode and operates the sounders normally.

11. Overview Of Engineers Functions

This section provides an overview of the functions available to the engineer.

11.1 Engineer’s configuration process

Most Engineer’s configuration facilities are controlled by DIL switches located on the motherboard accessed by opening the panel door, each configuration feature having its own dedicated DIL switch.

Zone/Output Delay Configuration

Having selected the DIL switch for configuring the delay zones or the DIL switch for configuring delayed outputs, the actual selection of the zones/output is carried out on the panel display using the yellow zone [or output] fault/disabled LEDs via the Cursor Select feature. This allows the Engineer to scroll a cursor indication up or down through the yellow LEDs associated with the available zones or outputs until the required zone or output is selected. The yellow LED for the selected

zone/output flashes in “Cursor” mode, which is easily distinguishable from all other indications. With the cursor flashing on the required zone/output, pressing the Enable button applies the configuration to the selected zone. Pressing the Disable button clears the configuration, restoring factory setting.

When configuring zones, the cursor can only be scrolled though zone LEDs. When configuring outputs the cursor is restricted to Fire Routing, Fire Protection and Sounder LEDs.

When a zone configuration or the delay outputs configuration feature is initiated, all standing fire alarms are reset, all fault/disablement/test indications are inhibited and the current configuration is indicated on the fault/disabled LEDs on the display for the appropriate zones or outputs. The panel is not able to respond to any fire or fault alarm.

The factory default configuration for the zones and delayed outputs can be restored by selecting the configuration DIL switches for each of the zone and output delay configuration features to ON then pressing the Disable switch on the display and finally setting the configuration switches back to the OFF position.

Other Configurable Features

All other configurable features involve either setting the appropriate DIL switch to ON or OFF or removal/replacement of jumpers on the motherboard.

11.2 Configurable Detection Zones

Display-based Select/Cursor configuration process allowing each detection zone to be individually configured to one of the following types:

- Latching or non-latching fire zone.
- Delay or non-delay zone.
- Standard or Intrinsically Safe zone.
- Short circuit gives fire indication.

Factory default: All zones as latching fire, non-delay, standard [non- intrinsically safe and non short circuit fire mode].

Note: The DIL switch labelled “Configure M.S. Zones” is used on the Precept^{en} panel to configure the zones to short circuit fire mode.

Latching fire configuration- This is the normal operating configuration and is used when fire detectors and manual call points are connected to the zone wiring.

Non-latching fire configuration - Provided to allow users to link panels together via the Fire Protection relay and non-latching zone without causing a system latch-up state, where the connected panels cannot be reset from an alarm condition.

A fire detector operation on a zone configured to the non-latch fire mode initiates the fire alarm condition on the panel, operates the fire alarm sounders, the Fire Routing output and zone outputs as normal. The Fire protection output can be configured to operate or not to operate via DIL switch 1/1. On clearing of the fire input signal on a non-latch zone the panel will clear the alarm indication if no other alarms are present.

11.3 Delay zone configuration

This facility is used along with the other delay configuration features listed below [see 11.5 below] to tailor the Panel Delay operation to the needs of the protected premises. Each zone can be independently configured to Delay Mode. Delay zones would normally be used to monitor automatic fire detectors. A fire condition on a delay zone will indicate the fire alarm audibly and visibly on the panel, operate any non-delayed outputs and start the time delay function.

11.4 Standard or Intrinsically Safe zone.

When configured to the **Standard Mode** the fire and fault trip thresholds for the zone being configured are set within the panel software to the normal values and are compatible with a large range of detection devices. This is the factory set condition.

When configured to the **Intrinsically Safe Mode** the fire and fault trip thresholds for the zone being configured are adjusted within the panel software to allow use with I.S barriers. The fault monitoring is configured to the passive mode suitable for use with end of line resistors only.

Note: Removal of a detector will be reported as a fault but will not allow the detection of a fire condition on any device connected between the removed device and the end of line terminator.

Warning: Use of capacitors on Intrinsically Safe circuits is dangerous and is not allowed.

11.5 Short circuit fire configuration

The default configuration:- short circuit on the zone wiring raises a fault warning.

When configured to the short circuit fire mode, a short circuit across the zone wiring initiates the fire alarm condition.

11.6 The Delay mode feature

This comprises three configurable elements to allow the panel to be configured to delay the operation of three types of outputs in response to a fire alarm condition triggered by a zone configured as a delay zone.

11.7 Configure Delay Zones

Zones can be configured as delay or non-delay. Fire detectors would normally be connected to delay zones and manual call points to non-delay zones. [See 11.3 above].

11.8 1- 2 Stage Delay

The delay can be set up as either a Single or 2-stage delay.

- Single stage: 1-10 minutes selectable duration in 1-minute steps.
- 2-stage: Delay 1:- 1-minute fixed delay. Delay 2:- 0-9 minutes [duration selectable as described above].

  Operation of the Buzzer Silence button before delay 1 ends will immediately start delay 2, otherwise all delayed outputs will operate after delay 1 ends.

11.9 Selection of outputs to be delayed

- The Delay Mode can be applied independently to each or all three of the outputs listed below:
  - Fire Alarm Routing Output.
  - Fire alarm sounders.
  - Fire Protection Output[s].

  No other outputs can be delayed. The factory default:- No outputs delayed.
- Operation of a fire detector or manual call point on any "non-delay" zone overrides the delay and immediately operates all delayed outputs.
- The panel display includes a Delay On/Off/Override button allowing the User to enable/disable the delay mode or, if the delay is running, to override it, immediately operating the delayed outputs.

11.10 Selectable Zonal or General Alarm sounder operation

Selects the sounders to:

- General Alarm Mode [all sounders operate for any fire condition] or
- Zonal Alarm [in conjunction with the Pulse Non-Alarm Zones switch]

  The standard sounder circuits on the 2 and 4 zone panels can be used in General or Zonal modes. On the 8,16 and 32 zone panels, these sounder outputs always operate in the General mode regardless of the setting on the general/zonal alarms configuration switch. The output expansion system [due later] provides additional sounders circuits for General or Zonal use on the 8, 16 and 32 zone panels.

11.11 Pulse Non-Alarm Zones

Selects the type of zonal sounder alarm response to a fire when the Zone Alarms feature described above is selected. The two selectable options are:

- Zonal sounders for zone in the fire condition operate continuously until silenced. All others are silent.
- Zonal sounders operate continuously - all other sounders operate in pulsed mode until silenced.

11.12 Inhibit Fire Protection on Non-Latched Zone

Selects Fire Protection relay to operate **or** not to operate for a fire condition on any zone configured to non-latched mode. This feature has been provided to allow two panels to be linked so that a fire condition on one panel triggers a fire on a zone on the other panel and vice versa without latching up. The zones used to monitor the signal from the other panel should be configured to non-latching and the Fire Protection relay should be used to transmit the fire signal.

11.13 Delay Alarm Silence and Reset

Prevents alarms being silenced and panel reset for a period of 3 minutes after a fire alarm condition occurs.

11.14 Alarms on Evacuate Only

Selects sounders to operate only when the panel is in the evacuate condition.

11.15 Silence Before Reset

Selects type of reset mode:

- Reset available when panel is in the [un silenced] fire or fault condition

or

- Fire Condition Reset is available only when panel is in the Alarm Silenced condition. Fault reset is available when panel is in the fault condition.

11.16 Silent Zone Test

Select sounder response in One Man [Detector] Test Mode:

- Normal sounder response [continuous or pulsed in line with panel configuration)

or

- Silent [no sounder operation].

11.17 Buzzer Disable

Enable/disable the internal panel fire/fault buzzer.

11.18 Latched Faults

When enabled, all fault conditions latch until the Reset switch is operated.

A latched zone fault will be cleared if a fire condition occurs on the same zone.

11.19 Repeater Configuration

To configure the panel to communicate with 1 to 5 remote indication panels via DIL switch selection on Repeater Interface Board.

11.20 Output Relay Configuration

The Fire Routing, Fire Protection and Fault routing output relays are individually link-configurable on

the motherboard providing one of the following options for each output:

- Volt-free change over relay output suitable for switching a maximum of 1 Amp at voltages up to 30VDC.
- Fault-monitored 28VDC powered output suitable for operating remote relays complying with the following requirements:

  Field relay spec: Coil resistance - 2.6 to 4.5 k Ohms. Operating Voltage 24VDC Nominal [min 18V, max 30 V], fitted with a suppression diode.

11.21 Earth Fault monitoring.

For installations where earth fault monitoring is unsuitable, it can be disabled by removal of link J18 in the bottom right hand corner of the C1627 motherboard.

12. Panel Repeaters

Precept[en] repeaters duplicate the panel indications and user controls at a location remote from the main panel. The repeater uses the same motherboard as the fire alarm panel although some of the components are depopulated. Up to 5 repeaters can be connected to a single panel using an RS485 serial connection. A C1631 repeater interface module needs to be fitted to connector J13/J9 located centrally towards the right-hand edge of C1627 motherboard on the fire alarm panel and also on the repeater motherboard.

Note: The disable/enable/test facilities and the configuration functions are not available at repeaters.

13. Circuit Connection Details

13.1 2-16 Zone Motherboard Termination Details

See Figure 13.

13.2 16 Zone Expansion Board Termination Details

See Figure 14.

Figure 13 - C1627 field termination

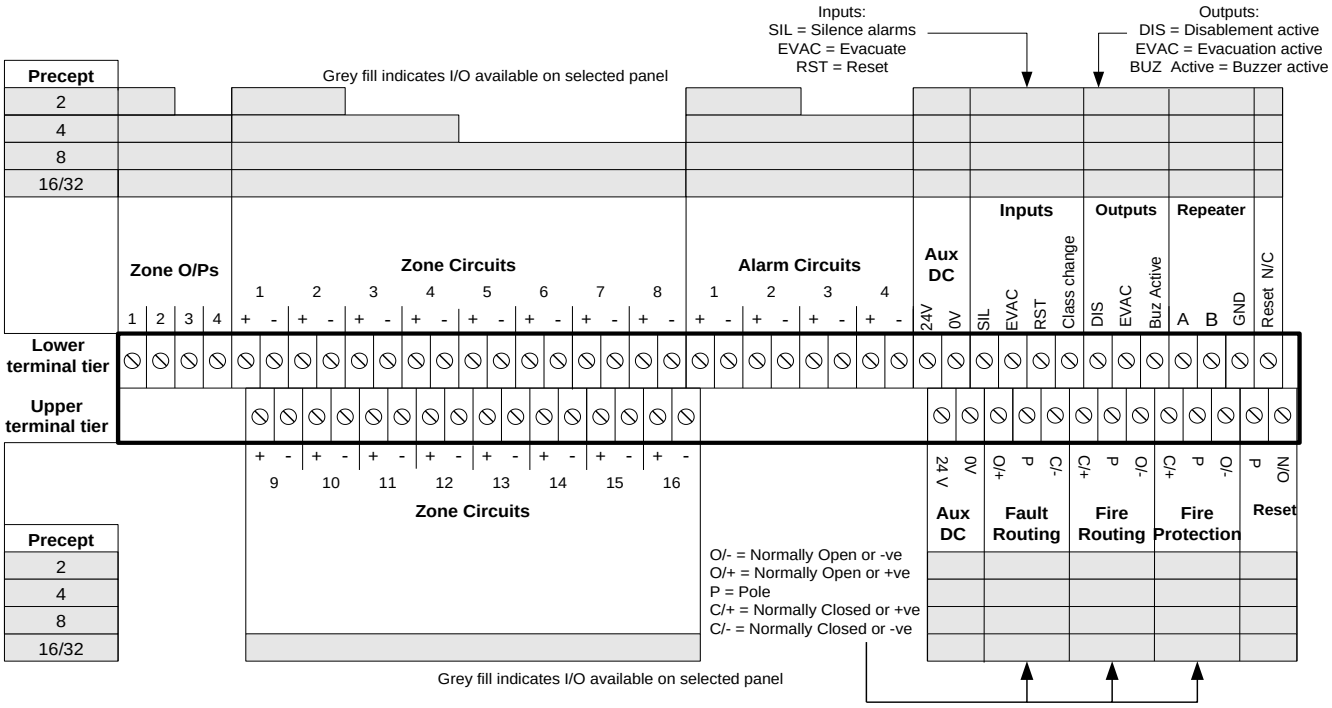
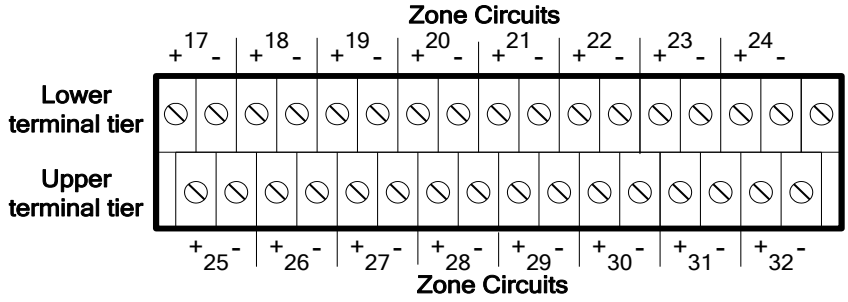


Figure 14 - C1632 16 zone expansion board field termination



13.3 Auxiliary Supply

An auxiliary DC supply is available to power external field equipment from the panel. This is nominally rated at 27.1V but varies due to temperature changes and also during mains failed conditions. See 17. below for details of maximum load.

The output is fused using an electronic device and fuse activation will be indicated as Fuse Failed on the panel display. The fuse can be reset after removal of the fault by operating the Reset button on the display.

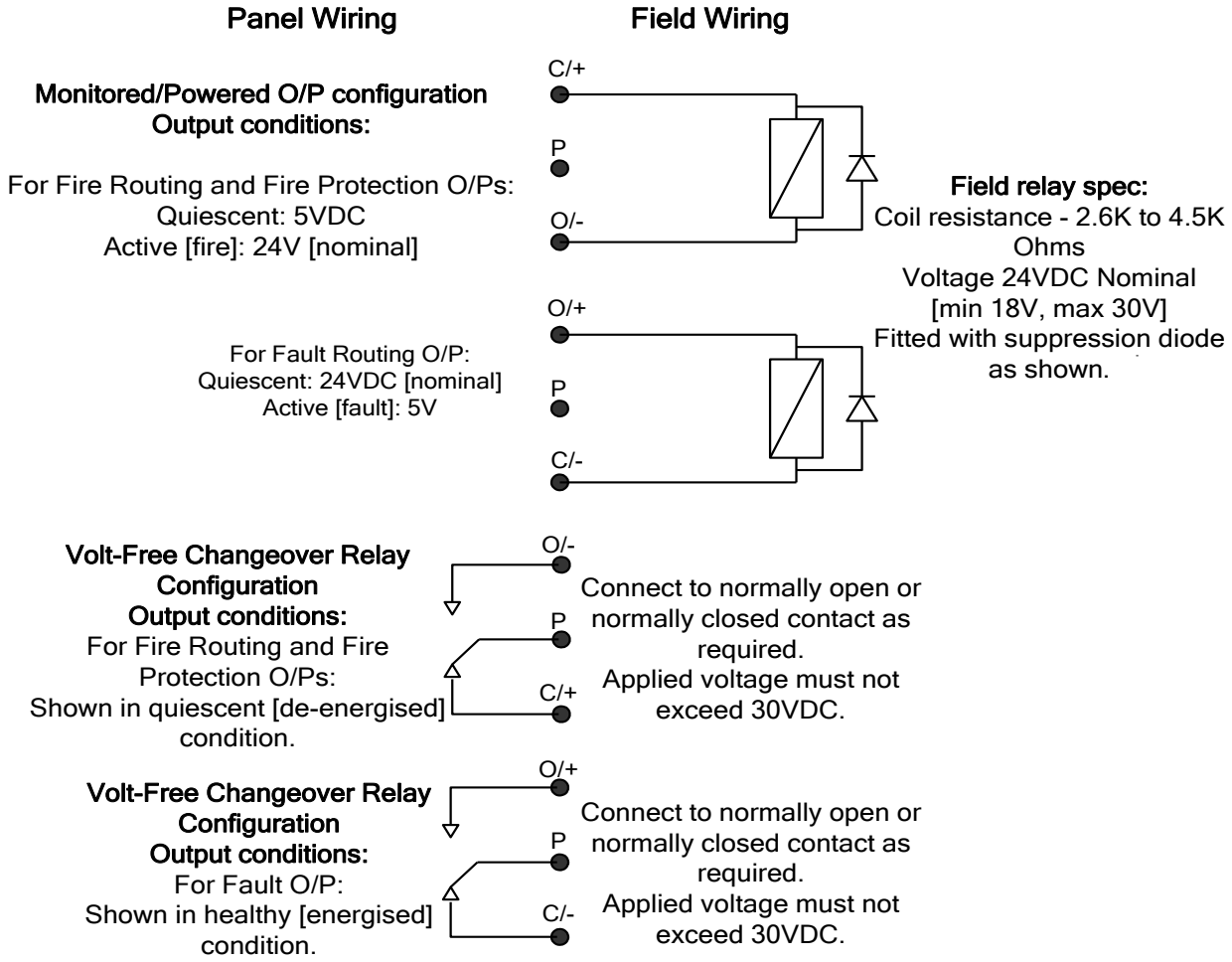
The auxiliary supply terminals are labelled Aux DC 0V and 24V. Although two sets of terminals are provided, they are both protected by the same fuse circuit and therefore the total load across both sets of terminals must not exceed the rated value.

Note: If equipment draws current from the auxiliary supply during the mains failed condition, this must be included in the battery capacity calculations.

13.4 Fire Routing, Fire Protection and Fault Routing Outputs

These outputs are factory-set to the fault monitored, powered mode of operation but can be configured at site to volt-free relay outputs [See 11.20 above]. Connection details for both types of configuration are provided in Figure 15.

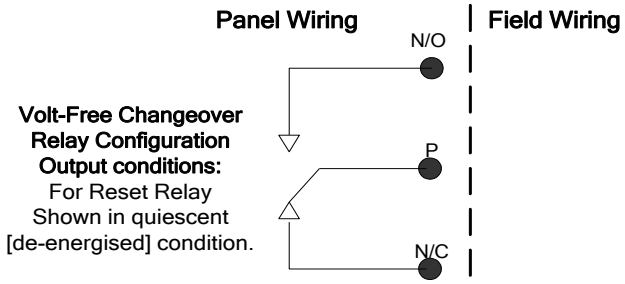
Figure 15 - Fire Routing, Fire Protection and Fault Routing Connections.



Note: Terminals are dual marked for monitored/powered and volt-free configurations.
For volt-free: O = Open, C = Closed, P = Pole
For monitored/powered: + = Positive, - = Negative

Warning: The volt-free auxiliary relay contacts must not be used to directly switch any voltage that exceeds 30VDC.

Figure 16 - Reset Relay contact connection details



Warning: The volt-free auxiliary relay contacts must not be used to directly switch any voltage that exceeds 30VDC.

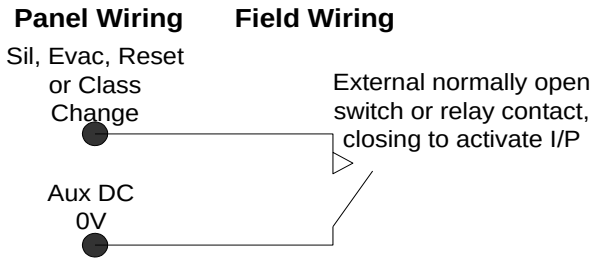
13.5 Use of Auxiliary Inputs

Auxiliary inputs are provided to allow remote operation of the following functions:

- Class Change.
- Remote Evacuate.
- Remote Silence.
- Remote Reset.

To activate an input, 0Vdc should be connected across the input circuit via a normally open contact arranged to close. [See Figure 17 - Auxiliary I/P connection detail]

Figure 17 - Auxiliary I/P connection detail

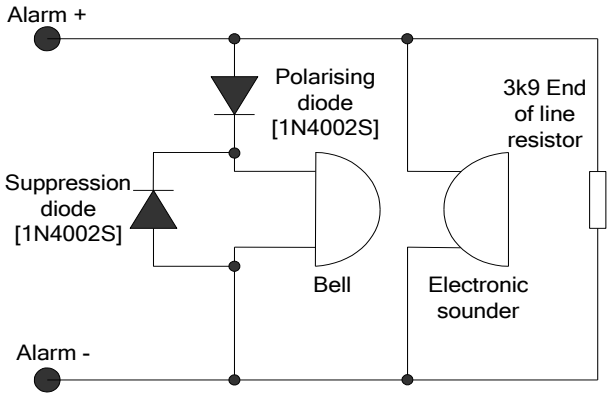

Panel Wiring
Field Wiring
Sil, Evac, Reset or Class Change
External normally open switch or relay contact, closing to activate I/P
Aux DC 0V

Note: To prevent unauthorised operation of the system, any manually operated auxiliary input must be operated by a key-switch. The key to the switch should be held with the panel's access control key.

13.6 Sounder Circuits

Precept[en] 2-zone panels have 2 sounder circuits rated at 0.5 Amps. 4-zone panels have 4, each rated at 0.5 Amps. The 8, 16 and 32-zone panels have 4 sounder circuits each rated at 1 Amp. The circuits are reverse-polarity monitored for open and short circuit faults. To allow monitoring, all devices must be polarised. To prevent damage to the control panel, bells must also have a suppression diode fitted as shown in Figure 18 - Alarm circuit configuration. The circuit must be terminated with a 3k9 end of line resistor.

Figure 18 - Alarm circuit configuration



The voltage drop on each alarm circuit should be calculated to ensure that the minimum voltage at the end of each circuit exceeds the minimum required by each sounding device.

The voltage at the end of the circuit is given by:

$V_{Amin} = V_{Omin} - (I_A \times 2 \times L \times R_C)$

V_{Amin} = Minimum Alarm Voltage

V_{Omin} = Minimum Output Voltage**

I_A = Alarm Current in Amps

L = Alarm Circuit Length in metres

R_C = Cable resistance (Ohms per metre)

** Min O/P voltages:

Precept[en] 32 = 18.4V

Precept[en] 8 and 16 = 19.2V

Precept[en] 2/4 = 19.2V

The resistance per metre is as follows:

1.5mm^2- 0.015Ω per metre per core

2.5mm^2- 0.009Ω per metre per core

14. Electrical Design of Detection Zones

To allow the panel to correctly monitor for fault conditions, the wiring for each zone must be installed as a continuous pair with no spurs or tees and be terminated with an end of line device; 22μF 35V capacitors for standard, non- intrinsically safe zones, 10k 0.25W for intrinsically safe zones. Correct polarity must be strictly observed throughout.

14.1 Maximum Number of Devices on a Zone

The maximum number of devices supported by a zone depends on the quiescent current drawn by each device and differs for intrinsically safe and non- intrinsically safe zones. The quiescent current will be listed on the device data sheet provided by the Manufacturers.

For **non- intrinsically safe zones**, the maximum current available is 5mA.

For **intrinsically safe zones**, the maximum current available is 0.8mA.

Note: To comply with BSEN 54-2, the maximum number of devices per zone is limited to 32 and the maximum number of devices connected to a panel is limited to 512.

Intrinsically Safe Zones

Warning: I.S zone wiring and equipment installation must comply with the installation guidelines provided with the I.S. fire detection equipment and the I.S. barrier. Any zone on which I.S. equipment is to be connected must be configured as an I.S. zone. [See11.4 above].

15. C1651 Timer Module - General

The LCD clock module is an optional feature for the Precept^{en} range of panels providing the Alarm Counter and Day/Night Delay Time features described elsewhere in this document. A jumper and DIL switch are provided on the clock module PCB to allow the following modes of operation to be set:

i. Day/Night Delay Time
ii. Day/Night Delay Time and Alarm Counter.
iii. Time of 1st fire alarm.
iv. Time of 1st fire alarm and Alarm Counter.

The module is fitted to the rear of the display PCB, inside a break-out window. Two DIL pin headers fitted to the rear of the display PCB provide all electrical connections. The module has a 2 by 8 character alphanumeric backlit LCD.

The clock module must be used with the "fully insertible" display overlay which has a clear window through which the LCD can be viewed. A tab on the end of the User Instruction insert normally blanks off the window. This tab must be removed before the insert is fitted to expose the window.

15.1 Clock Module Functionality

Alarm Counter

Complying with the requirements of EN54-2 clause 7.13, recording the number of times the panel enters the fire alarm condition.

The current count can be displayed or reset to zero manually when required.

Day/Night Delay Mode control

This allows the delay mode to be automatically controlled by the clock module. It can be set up to operate in one of two modes via a DIL switch 1/3 on the control panel motherboard:

Mode 1 - Automatically turns off the delay mode once a day at a set time [the delay mode first being turned on manually].

Mode 2 - Automatically turn the delay mode on once a day and off once a day at set times.

1st Fire Alarm Time

This displays the time of the first fire alarm. This condition is latched until the panel is reset and is not updated by any subsequent fire alarms [i.e. fire alarms which occur while the first alarm is still displayed].

15.2 Clock Module Edit Facility

The Clock Module has a simple edit feature to allow:

- Set time of day [User accessible].
- Set daily delay mode on/off times [User accessible].
- Selection of Day/Night delay mode on/off [Engineer accessible].

15.2.1 Clock Module- User Control/Editing

When the optional Clock Module is fitted, the User has access to select the status of the Day/Night Mode - either On or Off and to set the current time. These edit features are accessed by operating the Access key switch, pressing the Select button and using the Select ↑ Select ↓ buttons to scroll the cursor indicator through the selectable LEDs until the Clock Module is selected [Clock Module back light lit].

15.2.2 Clock Module Engineer's Editing and Configuration

Editing: Manual selection of the Day/Night Mode and setting the current time is described in the Precept^{en} Installation and Commissioning Manual.

Configuration:

Setting the time of day at which the clock module automatically turns the delay mode on/off is set using the Clock Module menu system as described in the Precept^{en} Installation and Commissioning Manual. Access to these extra menu pages is protected by a DIL switch on the rear of the Clock Module PCB.

A jumper and DIL switch are provided on the clock module PCB to allow the following modes of operation to be set:

i. Day/Night Delay Time
ii. Day/Night Delay Time and Alarm Counter.
iii. First Fire Alarm Time.
iv. First Fire Alarm Time and Alarm counter.

15.3 C1651 Clock Module PCB Features

Figure 19 llustrates the PCB features referred to elsewhere in the documentation

Figure 19 - C1651 Clock Module PCB

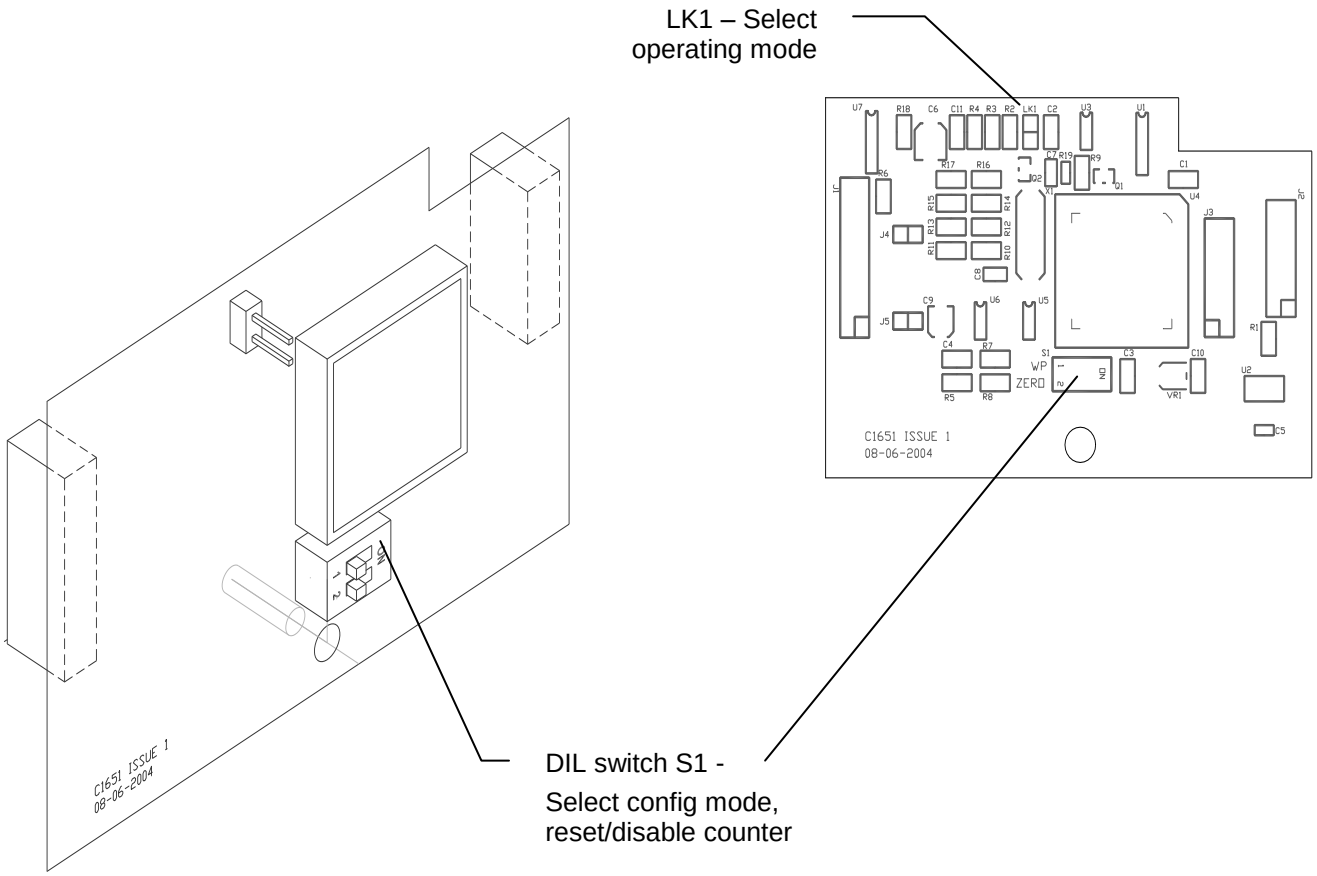
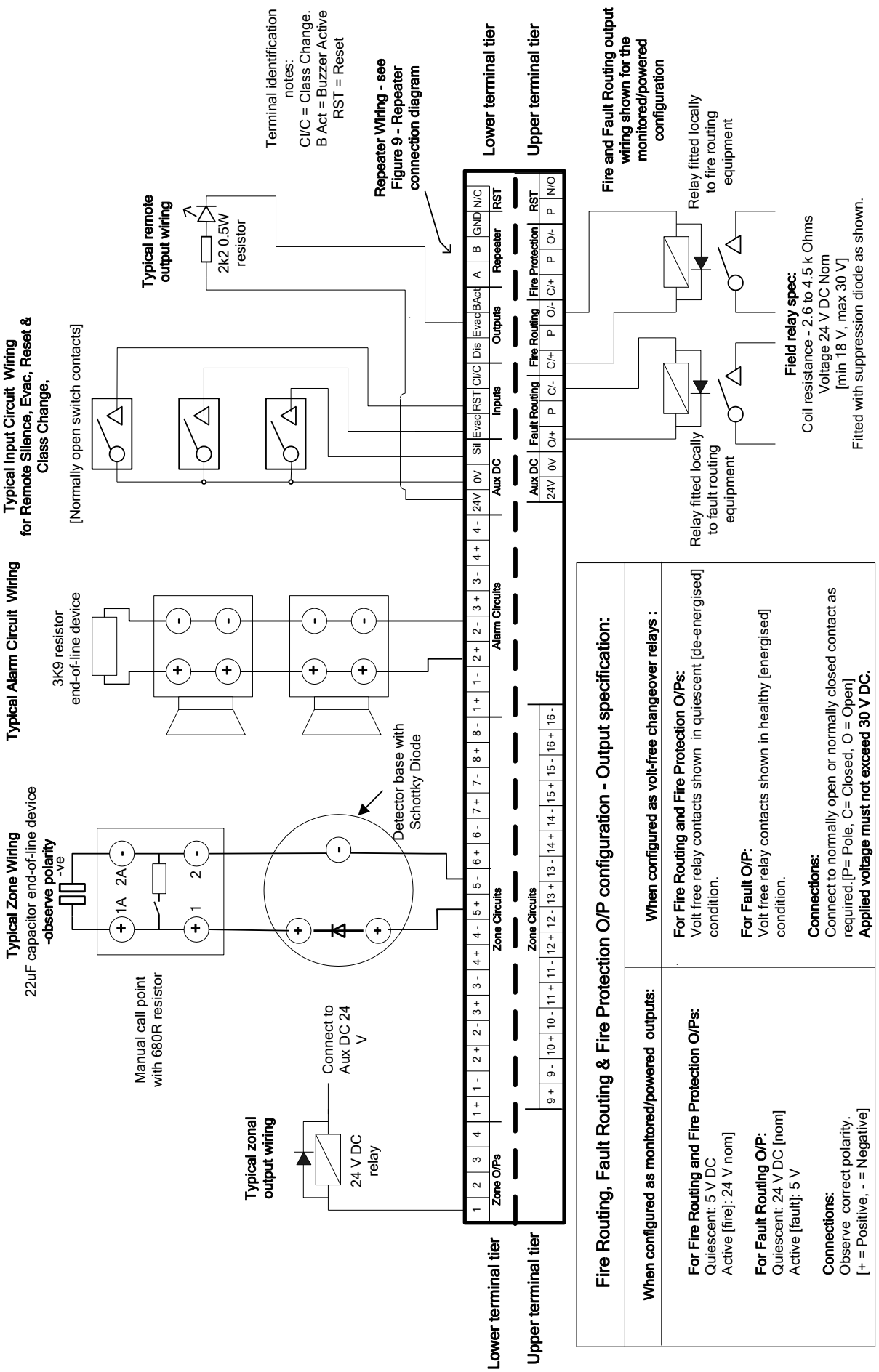


Figure 20 - Typical Precept[en] Wiring Diagram

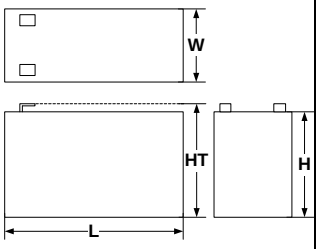

Typical Zone Wiring
22uF capacitor end-of-line device
-observe polarity
-ve
Manual call point with 680R resistor
Typical Alarm Circuit Wiring
3K9 resistor end-of-line device
Typical Input Circuit Wiring for Remote Silence, Evac, Reset & Class Change,
[Normally open switch contacts]
Typical remote output wiring
2k2 0.5W resistor
Terminal identification notes:
CI/C = Class Change.
B Act = Buzzer Active
RST = Reset
Repeater Wiring - see Figure 9 - Repeater connection diagram
Lower terminal tier
Upper terminal tier
Fire and Fault Routing output wiring shown for the monitored/powered configuration
Relay fitted locally to fire routing equipment
Relay fitted locally to fault routing equipment
Field relay spec:
Coil resistance - 2.6 to 4.5 k Ohms
Voltage 24 V DC Nom
[min 18 V, max 30 V]
Fitted with suppression diode as shown.
Detector base with Schottky Diode
Typical zonal output wiring
24 V DC relay
Connect to Aux DC 24 V
Zone O/Ps
Zone Circuits
Alarm Circuits
Inputs
Outputs
Aux DC
Fault Routing
Fire Routing
Fire Protection
Repeater
RST
Sil
Evac
CI/C
Dis
BAct
GND
N/C
N/O
Fire Routing, Fault Routing & Fire Protection O/P configuration - Output specification:
When configured as monitored/powered outputs:
For Fire Routing and Fire Protection O/Ps:
Quiescent: 5 V DC
Active [fire]: 24 V nom]
For Fault Routing O/P:
Quiescent: 24 V DC [nom]
Active [fault]: 5 V
Connections:
Observe correct polarity.
[+ = Positive, - = Negative]
When configured as volt-free changeover relays :
For Fire Routing and Fire Protection O/Ps:
Volt free relay contacts shown in quiescent [de-energised] condition.
For Fault O/P:
Volt free relay contacts shown in healthy [energised] condition.
Connections:
Connect to normally open or normally closed contact as required.[P= Pole, C= Closed, O = Open]
Applied voltage must not exceed 30 V DC.

16. Mechanical, Electrical And Environmental Specification

Mechanical Specification	Precept[en] Panel				Repeater		
	2/4 zone	8 zone	16 zone	32 zone	2-8 zone	16 zone	32 zone
Size [mm] Height: Width: Depth:	 370 325 126	 370 325 126	 370 325 126	 441 400 131	 370 325 126	 370 325 126	 441 400 131
Weight excluding batteries:	6.65Kg	7.05Kg	7.05Kg	9.35Kg	6.65Kg	6.65Kg	7.6Kg

Mains Input Specification	Precept[en] Panel				Repeater		
	2/4 zone	8 zone	16 zone	32 zone	2-8 zone	16 zone	32 zone
Maximum Input Power:	85W	165W	165W	240W	85W	85W	85W
Protection: **[Warning: Replace only with identical type & rating of BEAB or VDE approved fuse]**	T1A H250V [1A anti-surge]	T3.15A H250V [3.15A anti-surge]	T3.15A H250V [3.15A anti-surge]	T3.15A H250V [3.15A anti-surge]	T1A H250V [1A anti-surge]	T1A H250V [1A anti-surge]	T1A H250V [1A anti-surge]
Voltage:	230V AC +10%/-15%						
Cable requirements:	Minimum of 1mm^2 copper protected by a 5A fuse.						

Power Supply Output Specification	Precept[en] Panel				Repeater		
	2/4 zone	8 zone	16 zone	32 zone	2-8 zone	16 zone	32 zone
Maximum Short Term Current Output (I max b)	1.5A	3A	3A	5A	1.5A	1.5A	1.5A
Maximum Continuous Current Output (I max a)	0.6A	2A	2A	2A	0.6A	0.6A	0.6A
Minimum Output Current (I min)	N/A (PSU is integrated into the motherboard)			ZERO	N/A (PSU is integrated into the motherboard)		
Voltage Output, Mains On	26.5 - 28.6V (27.3V nominal)						
Maximum Current Output, Mains Failed	1.5A	3A	3A	5A	1.5A	1.5A	1.5A
Voltage Output, Mains Failed [* at full load]	20.0* - 28.6V	20.0* - 28.6V	20.0* - 28.6V	20.0* - 28.6V	N/A		
Max Ripple including switching spikes[full load/battery disconnected] (mV p-p)	200	200	200	750	200		
Output Voltage adjustment	Factory Set						
Output protection:	Electronic current limiting						
Common fault output:	N/A	N/A	N/A	25mA	N/A	N/A	N/A
Mains failed fault output:	N/A	N/A	N/A	25mA	N/A	N/A	N/A

Battery Specification	Precept[en] Panel				Repeater		
	2/4 zone	8 zone	16 zone	32 zone	2-8 zone	16 zone	32 zone
Battery charger output: [Temperature compensated float charger] 28.6V ±0.1V@-5°C 26.5 V±0.1V@ +40 °C.	1.5A	3A	3A	5A	1.5 A	1.5 A	1.5 A
Maximum internal resistance of battery & charger circuit: (Ri max) (Ω)	1	0.6	0.6	0.35	1	1	1
Battery type: **POWERSONIC** **[Warning: Replace only with identical battery]**	2 off PS1230 [12V 3.4Ah]	2 off PS1270 [12V 7Ah]	2 off PS12120 [12V 12Ah]	2 off PS12170 [12V 17Ah]	2 off PS1230 [12V 3.4Ah]	2 off PS1230 [12V 3.4Ah]	2 off PS1230 [12V 3.4Ah]
Battery size (mm): 	L = 133 W = 67 H = 60 HT = 66	L = 151 W = 65 H = 94 HT = 98	L = 151 W = 98 H = 94 HT = 100	L = 181 W = 76 H = 167 HT = 167	L = 133 W = 67 H = 60 HT = 66	L = 133 W = 67 H = 60 HT = 66	L = 133 W = 67 H = 60 HT = 66
Battery circuit protection: **[Warning: Replace only with identical type & rating of fuse]**	F2AL250V 20mm fast blow glass fuse	F5AL250V 20mm fast blow glass fuse	F5AL250V 20mm fast blow glass fuse	F6.15A L250V 20mm fast blow glass fuse	F2AL250V 20mm fast blow glass fuse	F2AL250V 20mm fast blow glass fuse	F2AL250V 20mm fast blow glass fuse
Mains failed fault battery current:	45mA	45mA	45mA	55mA	40mA	40mA	40mA
Mains failed alarm battery current:	80mA	80mA	80mA	90mA	75mA	75mA	75mA

Environmental Specification	All Panels
Operating temperature:	-5ºC to 40ºC
Operating humidity:	5% to 95%

17. Precept[en] Input and Output Specification

Detection zone Inputs	Precept[en] Panel			
	2/4 zone	8 zone	16 zone	32 zone
Qty	2/4	8	16	32
Specification	Conventional open and short circuit fault monitored. **Threshold current- Normal configuration:** Short circuit threshold: ≥ 57.85mA. Evacuate Manual Call Point alarm threshold: ≥ 37.92; <57.85mA. Detector/Alert Manual Call Point alarm threshold: ≥ 10.78; <37.92mA. Quiescent: <10.78mA. Open circuit: N/A (active monitoring via capacitor). **Threshold current- I.S. configuration [Using MTL5061 galvanic isolator]:** Short circuit threshold: ≥ 27.78mA. Evacuate Manual Call Point threshold: ≥ 20.92; <27.78mA. Detector/Alert Manual Call Point alarm threshold: ≥ 8.5; <20.92mA. Quiescent: ≥ 1.63; <8.5mA. Open circuit: <1.63mA.			
Cable requirements	Max resistance of circuit loop: 40 Ohms.			

Ancillary Inputs	Precept[en] Panel 2/4 zone	Precept[en] Panel 8 zone	Precept[en] Panel 16 zone	Precept[en] Panel 32zone
Zonal Fire Outputs for Zones 1-4	Open collector, 50mA 30V max input			
Class Change Input	Non- fault monitored. 0 Volt I/P to activate. I/P sensitivity: 0-1k Ohm			
Remote Evacuate Input	Non- fault monitored. 0 Volt I/P to activate. I/P sensitivity: 0-1k Ohm			
Remote Silence Input	Non- fault monitored. 0 Volt I/P to activate. I/P sensitivity: 0-1k Ohm			
Remote Reset Input	Non- fault monitored. 0 Volt I/P to activate. I/P sensitivity: 0-1k Ohm			
Cable requirements	Cable loop resistance <= 1k Ohm			
Earth Fault I/P	Alarm threshold between 10k Ohm to 70 k Ohm [dependant on circuit] between chassis and +ve or -ve line			

Outputs	All Panels
Evacuate [active] Output	Open collector. 50mA 30 V max
Buzzer [active] Output	Open collector. 50mA 30 V max
Disablement [active] Output	Open collector. 50mA 30 V max
Reset Relay	1 x Volt-free change over rated 1 Amp at 30V DC
Fire Routing Output	
Monitored configuration	Quiescent: 2Vdc; Active [fire]: 24Vdc nominal Field relay spec: Coil resistance - 2.6k to 4.5k Ohms. Voltage 24Vdc nominal [min 18V, max 30V], fitted with suppression diode.
Volt-free configuration	1 x Volt-free change over rated 1 Amp at 30Vdc
Fire Protection Output	
Monitored configuration	Quiescent: 2Vdc; Active [fire]: 24Vdc nominal Field relay spec: Coil resistance - 2.6k to 4.5k Ohms. Voltage 24Vdc nominal [min 18V, max 30V], fitted with suppression diode.
Volt-free configuration	1 x Volt-free change over rated 1 Amp at 30Vdc
Fault Routing Output	
Monitored configuration	Quiescent: 24Vdc nominal; Active [fault]: 2Vdc. Field relay spec: Coil resistance - 2.6k to 4.5k Ohms. Voltage 24Vdc nominal [min 18V, max 30V], fitted with suppression diode.
Volt-free configuration	1 x Volt-free change over rated 1 Amp at 30V DC
Cable requirements	No special requirements.

Alarm Circuits	**Precept[en] Panel**				**Repeater**		
	2/4 zone	8 zone	16 zone	32 zone	2-8 zone	16 zone	32 zone
Quantity:	2/4	4	4	4	N/A	N/A	N/A
Maximum Current: per circuit	0.5A	1A	1A	1A	N/A	N/A	N/A
Output Voltage (battery operation):	20- 28.6V DC						
Output Voltage (mains operation):	28.6- 26.5 V DC						
Fault Monitoring:	Reverse polarity for open and short circuit faults						
Protection [Self resetting electronic]	0.93A	0.93A	1.85A	1.85A	N/A		
Cable requirements:	No special requirements. Cable resistance and current load must allow a voltage at the end-of-line which is above the minimum operating voltage of the sounders.						

Auxiliary Supply	Precept[en] Panel				Repeater		
	2/4 zone	8 zone	16 zone	32 zone	2-8 zone	16 zone	32 zone
Maximum Current:	0.5A	1A	1A	1A	N/A	N/A	N/A
Auxiliary supply (battery operation):	20–28.6Vdc				N/A	N/A	N/A
Auxiliary supply (mains operation):	28.6- 26.5Vdc				N/A	N/A	N/A
Protection: [Electronic]	0.5 A	1 A	1 A	1 A	N/A	N/A	N/A
Cable requirements:	No special requirements. 1A minimum current rating. Minimum voltage at end-of-line must be above sounding device minimum operating voltage.						

Repeater Output	Precept[en] Panel			
	2/4 zone	**8 zone**	**16 zone**	**32 zone**
Number of repeaters:	1 to 5			
Maximum repeater cable length:	2000m			
Communication protocol:	RS485 serial data 9600baud			
Protection:	Electronic, current limited			
Cable Type:	Two pair RS485 shielded cable (see below)			

RS485 Cable Specification	
Generic Type:	RS422/RS485 data cable.
Conductors:	Two pairs plus screen.
Alpha cable:	57602, 58412, 57632, 58802, 58902 PLENUM RATED
Belden cable:	82842, 89842, 88777 PLENUM RATED

18. Appendix

18.1 EN54 Optional Functions With Requirements

The Precept[en] panel has the following EN54 optional functions.

- Clause 7.8 Outputs to fire alarm devices.
- Clause 7.9 Outputs to fire alarm routing equipment.
- Clause 7.10 Outputs to Fire Protection Equipment.
- Clause 7.11 Delays to outputs.
- Clause 8.9 Output to fault warning routing equipment.
- Clause 10 Test condition.

18.2 Ancillary Functions Not Required By EN54

The Precept[en] panel offers several auxiliary functions that are not required/allowed by EN54. These are:

- Fire Routing, Fire Protection and Fault Routing outputs can be configured to be volt-free change over contacts.
- Detection zones can be configured as non-latching.
- Detection zones can be configured for Intrinsically Safe applications.
- Detection zones can be configured to initiate the fire alarm condition when a short circuit is connected across zone wiring [used when replacing a panel on an older "non- short circuit" monitored system].
- Class change input for operating sounders briefly to signal class changes in educational institutions.
- Reset relay to interrupt power supplies to external equipment that needs to be reset in tandem with the Precept[en] panel (e.g. IR Beam Detectors).
- Engineer configurable features for:
  - To require the silencing of the fire alarm condition prior to enabling the fire alarm condition reset.
  - To inhibit the operation of the Fire Protection Output for a fire condition on a zone configured as non-latching.
  - To inhibit the silencing of fire alarm devices and resetting of the fire alarm condition for a period of 3 minutes after a fire alarm condition occurs.
  - To prevent fire alarm devices operating for any fire alarm condition other than the Evacuate condition.
  - To disable the panel buzzer.
- Open collector outputs for evacuate active, buzzer active, disablement active, zonal fire O/Ps for each zone up to zone 4.
- Remote inputs for remote evacuation, reset and silence alarms.
- One Man Sounder Test [see 5.2 above].
- Latching fault mode where all fault conditions latch until the panel is manually reset.
- Restore default configuration of zones and outputs.

18.3 Power Supply Load Calculation

The power supply load must not exceed a maximum identified below

Panel	Max Load
Precept[en] 2/4	1.4 Amps
Precept[en] 8	2.9 Amps
Precept[en] 16	2.9 Amps
Precept[en] 32	4.9 Amps

To determine the maximum power supply load perform the following steps:

1. Look-up the mains failed panel load in alarm. Enter this value as I_{panel}.
3. Calculate the maximum load on the alarm circuits in mA in an alarm condition. Enter this value as I_{alarms}.
4. Calculate the load on the auxiliary supply in mA in an alarm condition. Enter this value as I_{aux}.
5. Calculate the maximum power supply load using the formula below:

I_{panel} ……mA

I_{alarms} ……mA

I_{aux} ……mA

I_{pse} = (I_{panel} + I_{aux} + I_{alarms})/1000 A

= …… + …… + ……)/1000 A

= …… + …… + ……)/1000 A

(……)/1000 A

= …… A

Warning:

This current must not exceed the maximum power output of the power supply (see section 4.4)

Note: A battery and loop calculation spreadsheet is available from your panel supplier to assist in site calculations

18.4 Battery Standby Capacity Calculation

This section describes how to calculate the minimum required standby battery capacity for the

control panel. To determine the battery capacity perform the following steps:

1. Look-up the mains failed fault battery current. Enter this value as $I_{panelfault}$.
2. Look-up the mains failed alarm battery current. Enter this value as $I_{panelalarm}$.
3. Calculate the maximum load on the alarm circuits in mA in an alarm condition. Enter this value as I_{alarms} and enter this figure in the table.
4. Calculate the load on the auxiliary supply in mA in an alarm condition. Enter this value as $I_{auxfault}$.
5. Calculate the load on the auxiliary supply in mA in an alarm condition. Enter this value as $I_{auxalarm}$.
6. Calculate the total battery load in fault, I_{fault}.
7. Calculate the total battery load in alarm, I_{alarm}.
8. Enter the required standby time in hours, T_{fault}.
9. Enter the required time in alarm in hours, T_{alarm}.

$I_{panelfault}$ = ...mA

$I_{auxfault}$ = ...mA

I_{fault} = $[I_{panelfault} + I_{auxfault}]$ .....mA

T_{fault} = ...Hrs

$I_{panelalarm}$ = ...mA

I_{alarms} = ...mA

$I_{auxalarm}$ = ...mA

I_{alarm} = $[I_{panelalarm} + I_{alarms} + I_{auxalarm}]$ .....mA

T_{alarm} = hrs

10. Substitute the values in to the formula below.

C_{min} = $1.25 \times ((T_{fault} \times I_{fault}) + 2 \times (T_{alarm} \times I_{alarm}))/1000Ah$

= 1.25 x (..... x..... + 2 x (..... + ...))/1000Ah

= 1.25 x (..... +2 x (.....)/1000 Ah

1.25 x (.....)/1000Ah

= 1.25 x ...../1000Ah

= ...../1000Ah

= ..... Ah

11. Select the next highest available battery size.

Notes:

1. **The maximum battery capacities which can be charged according to BFPSA recommendations are:**

Panel	Maximum Battery Capacity
Precept[en] 2 and 4	12Ah
Precept[en] 8 and 16	24Ah
Precept[en] 32	40Ah

2. **Any battery which cannot be contained in the c.i.e. enclosure must be located in an enclosure adjacent to the c.i.e.**
3. **The approved panels accommodate internally mounted SLA batteries as listed below:**

Panel	Maximum Battery Capacity
Precept[en] 2 and 4	3Ah
Precept[en] 8	7Ah or 12Ah
Precept[en] 16	12Ah
Precept[en] 32	18 Ah

18.5 Panel Configuration Design Chart

Table 1 - Motherboard DIL Switch Configuration Design/Record

Switch	Position	Function	Setting
1-1	Off	Fire Protection relays operate for a fire condition on any zone.	
	On	Fire Protection relays operate for a fire condition on any latching fire zone.	
1-2	Off	Silence and reset available as normal.	
	On	Prevents alarms being silenced or reset for a period of 3 minutes after a fire alarm condition occurs	
1-3	Off	Clock Module automatically turns off the delay mode once a day at the set time [the delay mode first being turned on manually].	
	On	Clock Module automatically turns the delay mode on once a day and off once a day at the set times.	
1-4	Off	Configuration mode disabled.	
	On	Zones can be configured to non-latch mode via the Engineer's Select feature.	Table 2
1-5	Off	Configuration mode disabled.	
	On	Zones can be configured to Intrinsically Safe monitoring mode	Table 2
1-6	Off	Configuration mode disabled	
	On	Zones can be configured to "short circuit to fire" mode.	
1-7	Off	Configuration mode disabled	
	On	Zones can be configured to Delay Mode via the Engineer's Select feature.	Table 2
1-8	Off	Configuration mode disabled.	
	On	Configure delayed outputs via the Engineer's Select feature.	Table 3
1-9	Off	Single Stage Delay Mode.	
	On	Two Stage Delay Mode.	
1-10	Off	Sounders operate on any fire condition including evacuate.	
	On	Selects sounders to operate only when the panel is in the evacuate condition	
2-1	Off	Reset available when panel is in the [un silenced] fire or fault condition	
	On	Fire Condition Reset available only when panel is in Alarm Silenced condition.	
2-2 2-3 2-4 2-5	Off On	**Delay Duration** / **S/W 2/2** / **S/W 2/3** / **S/W 2/4** / **S/W 2/5** Delay disabled / Off / Off / Off / Off 1 minute / On / Off / Off / Off 2 minutes / Off / On / Off / Off 3 minutes / On / On / Off / Off 4 minutes / Off / Off / On / Off 5 minutes / On / Off / On / Off 6 minutes / Off / On / On / Off 7 minutes / On / On / On / Off 8 minutes / Off / Off / Off / On 9 minutes / On / Off / Off / On 10 minutes / Off / On / Off / On	*Mark actual settings on table*
2-6	Off	General Alarm Sounder Mode	
	On	Zonal Sounder Mode	
2-7	Off	Zonal sounders for zones in the fire condition operate continuously until silenced - all other zones are silent.	
	On	Zonal sounders operate continuously - all other sounders pulse until silenced.	
2-8	Off	Sounders operate in response to zone one-man test.	
	On	Sounders do not respond to a zone one-man test.	
2-9	Off	Buzzer enabled.	
	On	Buzzer disabled	
2-10	Off	Non-latched faults	
	On	Latched faults.	

Table 2 - Zone Configuration Design/Record

Zone No	Zone Configuration			
	Non-Latch	Intrinsically Safe	Short Circuit = Fire	Delay
1				
2				
3				
4				
5				
6				
7				
8				
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12				
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31				
32				

Table 3 - Output Delay Configuration Design/Record

Output	Output Configuration	
	Delay	Non-delay
Fire Routing		
Fire protection		
Alarm Devices		